APPENDIX H

INFECTIOUS DISEASES

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INFECTIOUS DISEASES

INTRODUCTION

This appendix provides information on a range of infectious diseases. Since the epidemiology and treatment recommendations change over time, as new antibiotics are developed and resistance to older ones evolves, more current information is available at the Centers for Disease Control and Prevention website at: http://www.cdc.gov/. Current information is critical for effective treatment. Obtain immediate medical consultation when treating patients suspected of having any serious infectious disease.

BEHAVIOR AND INFECTIOUS DISEASE TRANSMISSION

The risk of many infectious diseases can be greatly reduced by protective behaviors. These may be as simple as wearing a long sleeved-shirt or applying insect repellant to prevent a tick-born or mosquito transmitted disease. Prophylactic medications can prevent diseases such as malaria. Vaccinations prevent other infections. Lifestyle, including sexual practices, is also linked to infectious disease transmission.

SEXUALLY TRANSMITTED DISEASES

The goal is to prevent sexually transmitted diseases (STDs). Thus, prevention of STDs is an important part of any program of STD control, and prevention skills should be presented to both those at risk of becoming infected and to those already infected, so that future infections can be avoided. Education is also an important part of patient management.

Over 30 microorganisms can be sexually transmitted with many having similar symptoms. Despite this complexity, initial management (with subsequent referral) can be accomplished in many settings with a minimum of resources. The following clinical syndromes associated with sexually transmitted diseases will be discussed in this section:

- Urethral discharge (urethritis)

- Painful testicle (epididymitis)
- Genital ulcer
- Genital warts
- Lymphogranuloma venereum (LGV)
- Pruritis (itching)
- Vaginal discharge
- Lower abdominal pain

In evaluating patients at risk for STDs, remember that many of these diseases can be asymptomatic and the patient may not suspect he/she has infection. However, asymptomatic patients can also transmit disease to others.

The end of this section addresses general management issues including counseling, partner notification, referral, sexual practices, symptomatic individuals and prevention.

Urethral Discharge (Urethritis)

Urethritis is characterized by a discharge from the urethra and burning with urination. It is usually caused by one of two bacteria: *Neisseria gonorrhoeae* (which causes gonorrhea) and *Chlamydia trachomatis* (which causes chlamydia), both of which infect and irritate the urethra.

The usual incubation period for gonorrhea is 3-5 days and the discharge is yellow or green. The incubation period for chlamydia is longer, 1-5 weeks (usually 10-16 days), and the discharge is less profuse, less purulent (often white or watery) and less painful. About 20% of men with gonorrhea also contract chlamydia at the same time.

If a microscope is available, examination of a Gram-stain of the discharge may disclose gram-negative diplococci inside of white blood cells, diagnostic of gonorrhea and the patient should be treated for both gonorrhea and chlamydia. If the Gram stain of the exudate does not disclose white cells with gram-negative intracellular diplococci, the patient should be treated for chlamydia. If no microscope is available, it is difficult to distinguish gonococcal urethritis from chlamydial urethritis with surety and the patient should be treated for both.

Younger women may occasionally develop urethritis caused by *C. trachomatis*. These women do not have a urethral discharge, but have pain with urination due to the urethral inflammation. However, a urinary tract infection is more common cause of painful urination.

Various antibiotic regimens have been developed to treat gonorrhea and chlamydia, separately and/or together.

Painful Testicle (Epididymitis)

The epididymis, which stores sperm and is located on the posterior side of the testicle, may become infected by *C. trachomatis* (most commonly) or *N. gonorrhoeae*. In men >35 years of age, or in homosexual men, epididymitis is frequently caused by bacteria that cause urinary tract infections.

Epididymitis must be differentiated from acute testicular torsion (twisting of the testicle inside the scrotal skin, which can lead to loss of blood supply to the testicle.) **Acute testicular torsion is a medical emergency requiring immediate consultation and intervention**. If torsion is suspected, based primarily upon sudden onset, excruciating pain, age under 20, and elevation of the testicle, immediate consultation should be obtained because immediate surgery may be needed. Torsion of the testicle is a medical emergency.

Examination of a patient with epididymitis shows tenderness of the epididymis and possible swelling. In men with sexually transmitted epididymitis, there will usually be symptoms or signs of urethritis, but this may not be prominent (particularly in men with chlamydia). If possible, a microscopic examination of the urethral secretions or urine should be performed to look for white blood cells and microorganisms.

Management of epididymitis includes bed rest with elevation of the testicle, ice and analgesics. Antibiotics should be given for the presumed infecting agent.

Genital Ulcer

Erosions of the skin (ulcers) may be caused by *Herpes simplex* virus (genital herpes), *Treponema pallidum* (syphilis) and *Haemophilus ducreyi* (chancroid). Erosions may be caused by trauma (during sex or in zippers) or less commonly by reactions to medications (particularly tetracyclines).

The most common disease is ***genital herpes***, whose incubation period is five to10 days. Initially, small, ***painful***, grouped blisters occur which, over several days, break open into shallow ulcerations. Painful, swollen, lymph nodes in the groin may accompany the blisters and ulcers. Over ensuing days, the ulcers crust and heal; the entire process takes about 21 days for initial attacks. Subsequent attacks may occur and last seven to 10 days. Women with initial attacks may have accompanying erosions of the cervix.

The primary stage of ***syphilis*** is characterized by one to four ***painless*** smooth ulcers which appear about 21 days following infection. Small, minimally tender lymph nodes in the groin may occur. Without treatment, the ulcers heal after two to six weeks. As the ulcers are healing, or several weeks afterward, the secondary stage of syphilis occurs and is characterized by a skin rash consisting of small flat patches, often most noticeable on the palms and soles; patients may have a low-grade fever. Without treatment, the rash will resolve after about two to six weeks, but may return. Without treatment at this stage, patients may develop tertiary syphilis in one to 30 years, characterized by neurologic (stroke, dementia) or cardiac (heart valve disease) abnormalities.

Chancroid is characterized by one to four very ***painful*** ulcers which often appear quite ragged. Painful enlargement of the lymph nodes in the groin occurs in half of patients.

Management of genital ulcers is based upon the most likely diagnosis. Additional diagnostic tests (such as HIV/AIDS or syphilis) may also be indicated.

Genital Warts

Genital warts occur several weeks following infection with human papilloma virus (HPV). HPV warts look like warts elsewhere on the body, but differentiation from other causes of skin growths is not always easy. In either case, treatment is not urgent and evaluation and therapy can be delayed. Women with genital warts should have a Pap smear of the cervix because of the relationship among genital warts, cervical cancer and HPV.

Lymphogranuloma Venereum (LGV)

LGV is a systemic disease of venereal origin caused by a virus-like organism. The infectious agent is a *Bedsonia* organism closely related to that of psittacosis. Clinical disease is more common in males. Subclinical or inapparent infections, and an asymptomatic carrier state, have been described in females.

After an incubation period averaging one to four weeks, a small painless genital lesion occurs in about one fourth of patients. The lesion is an inconspicuous bump, blister, or shallow ulcer that heals within a few days and typically goes unnoticed by the patient. The earliest clinical signs are fever up to 103^0F (39.4^0C), chills, headache, malaise, coughing, and muscle and joint pain. Shortly after the onset of these symptoms, the patient becomes aware of a painful swelling in one or both groin areas.

The inguinal bubo is common in males. Early in the course of regional node involvement, one can feel one or more enlarged discrete movable tender nodes. These eventually become matted together into an oval-shaped mass.

As the disease progresses, some of these matted nodes undergo softening. Because there are nodes in different stages of evolution, the mass becomes large and lobulated with alternating areas of softening and hardness. The overlying skin becomes swollen, sometimes bluish-red in color, and fixed to the underlying mass. When pus forms and breakdown occurs, multiple fistulous tracts may open to the skin surface. Other symptoms less commonly found include lower abdominal pain and diarrhea due to involvement of nodes in the pelvis and around the rectum.

In brief, the patient with LGV appears as an acutely ill individual with no residual primary genital lesion, but with a painful, tender, firm, oval-shaped inguinal mass. The pain is exaggerated when walking due to the pressure by the inguinal ligament. Some relief may be obtained by walking bent over. Unless one suspects LGV, the patient may be mis-diagnosed with an inguinal hernia. Such patients have been subjected to unnecessary surgery.

Pruritus (Itching)

Pruritus may be caused by pubic lice (crabs) and scabies; both are parasites and in both cases, pruritus is caused by sensitization to the organism. The pruritus caused by lice is limited to the genital area while that due to scabies often occurs elsewhere on the body where the mite, *Sarcoptes scabiei*, has burrowed. For lice, the period between infestation and itching is 1-2 weeks for initial infections (and shorter for subsequent ones) while for scabies it is several weeks after initial infection but only a day or two after subsequent infection.

Adult lice and their eggs (nits) in egg casings may be seen with the naked eye clinging to pubic hairs, or adult lice may be in the crusts of skin scabs formed from scratching; a magnifying lens helps visualize adults and eggs. Pubic lice move slowly along hairs; they do not jump. Sarcoptes mites burrow under the skin, forming linear tracks and nodules (which house the mite); common locations are the groin, finger webs and axilla. Diagnosis of lice depends upon seeing the lice or their eggs; diagnosis of scabies depends upon seeing typical nodules.

Pubic lice are treated by: lindane shampoo (1%), (not recommended for pregnant or nursing women, or children <2 years of age);or, permethrin creme rinse (1%) or pyrethrins with piperonylbutoxide. Scabies is treated by: permethrin cream (5%); or, lindane (1%), applied to the body from the neck down and washed off after 8 hours. Carefully read and follow directions when using any of these preparations. They are toxic substances and are dangerous if misused. For both diseases, bedding and clothing should be machine washed and machine dried using a hot cycle. Ironing clothes also kills the parasites.

Vaginal Discharge

Vaginal discharge is a common symptom that can be normal or a symptom of various infections. Normal vaginal secretions vary with hormonal balance and the menses cycle. Normal secretions are painless, clear, and thin, but can be quite profuse at some times of the month.

Some infections present with a vaginal discharge. Trichomonas causes a white, frothy discharge with itching. Monilia, or a yeast infection, is characterized by a white, cheesy discharge resembling cottage cheese. Nonspecific vaginitis is due to a range of bacteria, and can have differing presentations. Some infections, such as chlamydia and gonorhhea in women, may have no symptoms. Treatment of an abnormal vaginal discharge differs with the particular organism.

Lower Abdominal Pain

Lower abdominal pain is characteristic of pelvic inflammatory disease (PID), in which microorganisms ascend through the cervix into the uterus and fallopian tubes. The most common organisms involved are *N. gonorrhoeae* and *C. trachomatis*. Other causes of lower abdominal pain, i.e. appendicitis, should always be considered before making a diagnosis of PID. **Appendicitis is a medical emergency that is life threatening if untreated.**

PID is characterized by acute or gradual onset of pain in the lower abdomen. Since many things can cause this, thorough abdominal and pelvic examinations by a qualified and credentialed provider are usually needed for accurate diagnosis. Because PID is difficult to diagnose, it is often treated on the basis of suspicion and reasonable exclusion of other causes of abdominal pain. Reasonable exclusion can be difficult, however, and consultation should be sought before beginning therapy. Appendicitis is one common condition that may be confused with PID.

Management of PID may require hospitalization. However, once the diagnosis is made, the patient can usually be treated with antibiotics as an out-patient.

Counseling

Treatment of an STD should include counseling the patient about safe sexual practices to prevent further disease transmission. All patients with symptoms in the genital area, whether successfully treated or not, should not have sex until signs and symptoms have disappeared and they have been evaluated by skilled personnel. Because individuals with an STD have shown, by acquiring an STD, that they do not utilize safe sex practices, prevention counseling should be stressed.

Partner Notification

Patients with STDs should ensure that their sex partners, including those without symptoms, are referred for evaluation and treatment.

Referral

The management of patients with STDs, while seemingly simple, is complex and patients treated for an STD should be evaluated by more **skilled** personnel as soon as feasible, even if symptoms have gone away. Subsequent evaluation should include a physical and laboratory examination for the disease treated and other STDs, including a serologic test for syphilis and often a test for HIV.

Sexual Practices

Gonorrhea and other venereal diseases can occur at several sites. Gonorrhea may occur in the pharynx, but is usually asymptomatic and examination will be normal. Gonorrhea in the anus may be asymptomatic or associated with an anal discharge and rectal urgency. The infections that cause genital ulcers may occur in the mouth or anus. The ulcer of syphilis in the anus may go unrecognized because it is painless.

Exposed, but Asymptomatic, Individuals

Often individuals have had sex without a condom and, although asymptomatic, are worried about having possibly acquired an STD. The risk of having contracted an STD is dependent upon the likelihood that the partner had an STD (prostitutes or minimally-known partners having the highest risk), frequency of intercourse, and the gender of the worried individual (women being at higher risk). Prophylactic antibiotics are not recommended. The individual should watch for signs of illness and, even if

symptoms do not appear, seek medical attention for an examination as soon as feasible.

Prevention

STDs can be prevented through abstinence, sex with a uninfected partner, or use of a latex condom; of these, abstinence is the surest means. It is not possible to know that a new sex partner is free of all STDs. Latex condoms are highly effective when used properly, but may be misused, and will not protect against STDs acquired through foreplay or from diseases that occur outside of the area protected by the condom, i.e. crabs or vulvar ulcers. Nevertheless, when abstinence is not possible, the high efficacy of condoms in protecting against STDs, and their correct use, should be stressed.

Individuals should also be counseled to cease sexual activity and seek medical attention should symptoms appear in the genital tract, whether condoms have been used or not.

HUMAN IMMUNODEFICIENCY VIRUS INFECTION/ ACQUIRED IMMUNODEFICIENCY SYNDROME (HIV/AIDS)

Incubation Period: The time from HIV infection to seroconversion (a positive result on an HIV antibody laboratory test on blood or oral fluid) is a few weeks to a few months. The interval between HIV infection and diagnosis of AIDS varies greatly with today's treatment; the range in adults is from about two to 15 years.

Isolation Period: None – Standard Universal Precautions required.

Acquired immunodeficiency syndrome (AIDS) is the name given to a complex of health problems reported first in the United States in 1981. Persons with AIDS suffer a severe loss of natural immunity against disease, leaving them vulnerable to diseases that are not a threat to most persons. These diseases are often referred to as "opportunistic."

AIDS is caused by a retrovirus, known as human immunodeficiency virus (HIV). Tests for HIV antibodies are in widespread use and confirmed positive test results indicate infection by the virus. The HIV tests are sensitive and specific and should be offered to those at risk for infection and to all pregnant women. They are also used by blood banks to assure a safe blood supply.

HIV is transmitted sexually and through contact with blood such as when injecting illicit drugs or in tattooing. HIV also may be transmitted through transfusions of blood or blood components, medical contact with blood (as in surgery or in treating open wounds), and prenatally from HIV infected mothers to their infants.

Most AIDS cases have occurred among sexually active young adults age 25-44 years. Persons of all races, nationalities, ages, and sexual orientations have been affected.

Of the cases reported in the United States, the more common manifestations include severe immunosuppression (as measured by a decline in the T-helper lymphocyte count to below 200 cells per ml of blood), wasting syndrome (loss of more than 10% of body weight), *Pneumocystis carinii* pneumonia (PCP), tuberculosis (TB), bacterial pneumonias, cytomegalovirus retinitis, Kaposi's sarcoma, cryptococcal meningitis, candidiasis of the esophagus, toxoplasmosis of the central nervous system, and cryptosporidiosis (a parasitic infectious diarrhea).

Prevention

To prevent AIDS, one must prevent contracting or transmitting HIV by

- Not having sexual contact with persons known or suspected to have HIV infection or AIDS; or at high risk for HIV infection.
- Not having sex with multiple partners or with persons who have had multiple partners (including prostitutes). The more partners you have, the greater your risk of contracting HIV infection.
- Not injecting illicit drugs. If you do inject drugs, you may lessen your risk by not sharing needles or syringes.
- Not having sex with people who inject drugs.
- Not using alcohol, drugs, or inhalant nitrites (poppers), which impair judgment and may prompt you to engage in risky behaviors you might otherwise avoid.
- Protecting yourself and your partner during sexual activity. If you are not in a long-term monogamous relationship with a partner known to be uninfected, you should:
  - Use condoms consistently and correctly.
  - Avoid sexual practices that may cause injury or bleeding.
  - Avoid direct contact with semen, vaginal fluids, and blood.
  - Note: these practices reduce, but do not eliminate, HIV transmission.

Treatment

Although there is no cure, therapy for HIV infection and AIDS now exists. Antiviral agents have been licensed and offer promise, but no lasting method to restore lost immune function has been found. A cornerstone in the management of HIV-infected patients is the prevention of opportunistic infections, particularly PCP and TB, which should be routinely tested for and treated aggressively. Patients should be referred to a physician for initial management and long-term follow up.

SEXUAL ASSAULT AND RAPE

Management of sexual assault and rape includes medical and legal aspects. Medical treatment should be done by specially trained providers who know how to use the forensic evidence collection kit.

Sexual assault and rape are violent acts with sex as the weapon. They occur without the consent of the victim by use of force or threat of force. Law enforcement experts call rape one of the most under-reported crimes. Rape and sexual assault know no geographic boundaries and can occur aboard a vessel at sea.

Reporting suspected sexual assault or abuse of a child is required by law; it is the responsibility of the health care provider to follow reporting requirements of the state or local child protective service agency.

The impact of sexual assault can be severe. Besides signs and symptoms of physical trauma, victims may experience a range of emotional, cognitive, and psychological symptoms. These may include: confusion, anger, rage, dependency, crying spells, poor memory and concentration, nightmares and flashbacks, problems with eating and sleeping, fatigue, fear, anxiety, depression, work problems, feelings of abandonment, and withdrawal from friends and family. Victims' feelings of guilt, shame, and confusion can be compounded when there is no weapon and they know the attacker.

Listening to a victim's traumatic details may cause health care providers to react with disbelief, disgust, fear, and/or powerlessness; these attitudes and responses add to victims' trauma. Training about sexual assault and knowing where to find help is strongly urged. Training should include communication and crisis intervention skills; knowledge of the medical, legal, and emotional issues that victims face; and, awareness of one's own feelings, beliefs, values and attitudes that affect one's ability to help sexual assault victims.

Medical and legal assistance should be provided as soon as possible after the attack, ideally within 24 hours. Decisions to tell family and/or friends should be explored. In emergencies, police may help to move the victim to a hospital. Also, prompt police reporting can help to find the attacker as soon as possible. Victims are usually unaware of medical and legal factors and require assistance with these issues and decisions.

Treatment should address physical, emotional, social, and psychological needs. Approach the victim with empathy, respect, acceptance, support, and understanding. Avoid unnecessary questions, advice, criticism, and inappropriate self-disclosure. Give emergency first aid until medical care is available**. If at all possible, victims should not bathe, clean up, douche, or change clothes before medical care and/or reports to police. Do not destroy clothes, towels, or anything that could contain evidence.** Definitive medical care will include treating the victim's injuries, performing appropriate routine exams, such as gynecological and anorectal, and assisting police or other law enforcement personnel with collection of forensic

evidence. Treatment will also include instructions for follow-up medical care and possible prophylactic treatment for venereal disease and/or pregnancy.

Frequently, sexually transmitted diseases (STD) are diagnosed at initial or follow-up medical visits following sexual assault. This can increase the victim's anxiety and emotional problems as well as delay recovery. Diagnosis of STD will be the basis of medical treatment and may also be used as forensic evidence. Treatment protocols and routines using prophylactic antimicrobials should be tailored to the victim's individual circumstances. The Centers for Disease Control and Prevention (CDC) provide guidelines for diagnosis, treatment, and follow-up of STD for victims of sexual assault. All victims should be offered HIV counseling and testing.

If at all possible, secure the expert services of a sexual assault forensic examiner and clinician. They can render emergency medical and psychological treatment and intervention, collect evidence, make appropriate follow-up referrals, and provide the court system with an expert witness if necessary. Ship to shore communication may be necessary to obtain the appropriate advice and consultation in this instance. Consult with local hospitals and the police for assistance with sexual assault protocol and forensic evidence collection kit information.

Resources and Referrals:

Referrals for sexual assault and crisis counseling are important to victims' recovery. Major resources include:

- Sexual Assault and Rape Crisis: local official health agencies
- Medical: STD Clinic for sexually transmitted diseases and confidential AIDS testing.
- Home Safety: local crime prevention unit
- Legal: State's Attorney Office
- Hospital, physician, or emergency room bills for collection evidence: Local department of health or crime victim compensation program.

TATTOOING

The word tattoo comes from the Tahitian word *tatu* which means "to make a mark". The art of tattooing has existed for 14,000 years with its earliest roots in Egypt. Historically, tattoos were used to indicate social status, religious beliefs and mark criminals. Today tattoos are symbolic for many reasons including membership in a particular group, the achievement of manhood or simply as an art form. There are many reasons for getting a tattoo and there are many issues to consider before getting one.

A tattoo is created by puncturing the skin with a bundle of needles and inserting indelible (permanent) ink into the second layer of the dermis. When receiving a tattoo, a person is at risk of getting a bacterial infection and blood born infections such as HIV (human immunodeficiency virus) and hepatitis. Proper infection control

procedures are essential. New needles or properly sterilized needles must be used for each person receiving a tattoo.

The methods for removing a tattoo are surgical excision, chemical peel and laser. There are advantages and disadvantages for each of these methods. Each method is extremely expensive and with the exception of laser, leave some amount of scarring.

Tattooing has been used in the civilized world for many thousands of years and is popular in the United States. Many issues must be addressed when contemplating getting a tattoo. The United States maintains strict guidelines for tattoo artists to follow to minimize infection risks. Many states and cities require the use of autoclaves (machines to sterilize equipment) and supervision by a physician.

Most states require that individual needles be used for each patient, with an inventory system required of the facility. Many foreign locales have no such guidelines. The decision to get a tattoo must be made with a clear mind. Finding the safest tattoo artist who understands and practices good infection control is critical to reduce the health related risks associated with getting a tattoo.

ANTHRAX (CUTANEOUS)

Incubation Period*:* Within 7 days (usually 2 to 5 days).

Isolation Period: None. Cover skin lesion until lesion is free of anthrax bacilli.

Anthrax is an acute, infectious bacterial disease that is caused by *Bacillus anthracis*. It is rare in the United States and most western countries. Primarily a disease of sheep, goats, cattle, and horses, it occurs most commonly among wool sorters, felt makers, tanners, and others who work with animals or their products. If cattle, wool, goat hair, or hides are shipped by sea, exposure to anthrax is a possibility.

When anthrax appears as a skin disease, it may look like an ordinary vesicle, boil, or carbuncle. However, the surrounding skin may become swollen. If the skin lesion ruptures, serous (straw-colored) fluid escapes, revealing a black eschar or scab at the base of the ulcer. There may be severe systemic symptoms such as fever or prostration.

It is difficult to distinguish anthrax from an ordinary boil. Someone with a severe skin reaction surrounding a boil plus other bodily symptoms should be treated with antibiotics.

Treatment

Adults who may have been exposed to anthrax may be prophylactically treated with oral ciprofloxacin or doxycycline if the bacteria's susceptibility to penicillin is unknown. Children should be given oral amoxicillin.

Anthrax infection is treated with a combination of antibiotics.

Note: Inhalation anthrax as a bioterrorist agent is discussed in Chapter 8.

CHICKENPOX (VARICELLA)

Incubation period: 14 to 21 days.

Isolation period: For 1 week after rash appears or until all lesions become crusted.

Chicken pox is a highly contagious viral disease that produces a typical rash. It is usually a disease of children and typically occurs in the late winter and early spring. The virus is spread by airborne respiratory secretions as well as by direct contact. It is communicable from a few days before the rash appears until all vesicles have crusted. Individuals normally have it one time and will not be infected again as adults. However, if one did not have it as a child, one can get it as an adult. The disease in adults is often more serious than in children. Adults can present with such complications as viral pneumonia and meningoencephalitis.

The disease begins with a running nose, tearing eyes, slight fever to about 101^{o}F (38.3^{o}C), occasional sore throat, loss of appetite, decreased energy, and restlessness. Within 24 hours an eruption appears, mostly on the trunk and face, and occasionally on the arms and legs. The skin lesions arise in crops of vesicles (clear fluid-filled blisters on a slightly raised red base), may become pus-filled, and crust in a few days. As healing occurs, the crusts or scabs fall off.

As mentioned above, lesions of chicken pox typically appear in crops which erupt at different stages on a given area of the body. Thus some areas have new vesicles while earlier eruptions are crusting over. This helps to distinguish chicken pox from other viral rash illnesses.

Treatment

A vaccine is now available and is recommended for certain persons with no prior history of infection.

Oral acyclovir, started within the first 24 hrs decreases the duration and severity of illness. Its use is not recommended for otherwise healthy children (less than 12 yr.). Medical advice should be obtained prior to instituting such therapy.

Patients should be kept in bed and isolated from the rest of the crew. Care should be provided by crewmembers with a known history of chicken pox. Non-immune crew and anyone with immune deficiency should be protected from exposure. Adults should be treated with acetaminophen for fever. For persistent itching, diphenhydramine should be given by mouth. Children should receive similar therapy based on dosages appropriate for age and weight. Diet and liquids should be given

as tolerated The patient's nails should be trimmed closely and scrubbed daily to prevent bacterial contamination of the lesions by scratching. In all cases of suspected chicken pox, medical advice by radio should be obtained.

CHOLERA

Incubation Period: 12 hours to 5 days (usually 1 to 3 days).

Isolation Period: None. However all crew members must be isolated from patients' fecal matter and vomitous to prevent spread.

Cholera is an acute disease characterized by profuse watery *diarrhea*, often with vomiting and prostration. It is caused by intestinal infection with certain strains of the bacterium *Vibrio cholerae.* In severe cases, it causes profound and sometimes fatal *dehydration*.

Cholera occurs in many parts of the developing world, sometimes causing large epidemics. Many ports in Latin America, Africa, and the Indian subcontinent have recurrent cases of cholera. Cholera is usually acquired by exposure to unclean water sources or by eating seafood exposed to such water sources. Food and beverages can also become contaminated if they are prepared by persons infected with *V. cholerae* who have not washed their hands well. Cholera is not transmitted through direct contact with an infected person, though it is readily transmitted through any fecal contamination from an infected person.

The symptoms of cholera usually begin within one to three days after exposure. Diarrhea may be the only symptom in mild cases. In more severe cases, patients have profuse watery diarrhea, vomiting, and prostration or collapse. Typical stools are almost clear water with shreds of mucus, and are described as rice-water stools. The diarrhea may be continuous, leading to tremendous loss of body fluids and dehydration. Initially the patient may feel thirsty and have a dry mouth. As the dehydration worsens, the patient may develop sunken eyes, a rapid or weak pulse, and may feel dizzy. Untreated, the dehydration may lead to death in as little as a few hours. Without appropriate treatment for dehydration, about half of patients with severe cholera will die. However, with prompt and appropriate treatment for dehydration, less than 1% of these patients die.

Treatment

To prevent a ship-board epidemic, other crew members must not be contaminated with the patients' fecal matter. Good hygienic practices are required by all crew members. Patients with the symptoms of cholera should immediately receive treatment, as described below, without waiting for a physician or laboratory to confirm the diagnosis. Medical advice should also be obtained promptly by radio.

The most important aspect of treatment for cholera is replacing the lost fluids rapidly by way of rehydration therapy. Most patients can be treated with *oral rehydration salt* (ORS) solutions. Severe cases may require intravenous therapy. A single ORS packet is mixed with one liter of clean (boiled) water and provides the correct balance of fluids, salts and sugars required by cholera patients. All vessels should stock ORS packets. One can visit the website for information on treatment with and worldwide sources for ORS at www.rehydrate.org.

Proper administration of ORS is simple. The basic principle of rehydration therapy is to replace the fluids and salts that are lost through diarrhea and vomiting. This means giving a lot of ORS. The amount of ORS needed varies, depending on the severity of the dehydration and the amount of ongoing fluid losses. Patients need to drink more ORS than the total volume of fluid lost through diarrhea and vomiting. Patients should have ORS constantly available at the bedside and should be encouraged to drink as much as possible. Even patients with vomiting can be rehydrated with ORS taken in frequent small sips. An indication that rehydration therapy is succeeding is regular urination (every 3 to 4 hours). Patients should resume a normal diet as soon as they are able.

Treatment with antibiotics can shorten the duration of illness but is less important than rehydration therapy. Oral antibiotics should be used if indicated and such therapy should be under the direction of a physician. No other drugs for treatment of diarrhea or vomiting should be given. One should particularly avoid anti-diarrheal agents.

Cholera could spread in a devastating outbreak if even a tiny amount of the patient's stools or vomitous contaminated the food or water of others on board. To avoid spreading cholera, stools and vomited matter should not be released into the environment; they should be flushed into the ship's sewage treatment system or retention tank. Handwashing by all crew members after toileting and before eating is critical.

All articles soiled by the patient should be rinsed in a disinfectant such as chlorine bleach, washed with soap and very hot water, and thoroughly dried before being reused. Ironing clothing, bed linens and other items also disinfects them. The patient's room, personal effects, and any part of the ship that may have been contaminated should also be carefully disinfected. Caregivers should wash their hands thoroughly with soap and water after contact with the patient or the patient's feces or vomitous, and they should not prepare food for others. Prophylactic antibiotics for caregivers or other contacts of cholera patients are generally not recommended. While the patient is ill and for three weeks until recovery, the patient should be especially careful to wash their hands with soap after toileting. Isolation of cholera patients can be helpful. They should not have any contact with food or water used by other persons on the ship, and should not be allowed into the galley.

Cholera is an officially *notifiable disease*. When a patient who might have cholera is aboard, the Master is required to notify local health authorities as soon as possible at the next port of call, station, or stop. The Master is required to take such measures

as the local health authorities direct to prevent the spread of disease. Because cholera can be acquired from water, the ship's water system should be checked for any possible contamination. The Master and crew should be alert for more cases of cholera. Any person who has diarrhea should be reported to the Master and should take the measures described above to prevent the spread of illness. When port is reached, patients should receive medical evaluation and should submit stool specimens for culture for *V. cholerae.*

Prevention

With proper cholera prevention measures, merchant vessels can proceed in and out of cholera-affected areas while protecting crew members and passengers from becoming infected. The local health authorities (port, medical and American Consular) should be consulted when food and water are taken aboard. Drinking water should always be disinfected (boiled, chlorinated or chemically treated) aboard ship. If crew members go ashore in a cholera-affected port, it is preferable that they not eat or drink anything while ashore. Both ashore and aboard ship, to avoid illness, food and beverages must be selected and prepared with care. Foods from street vendors should be avoided. Raw or undercooked foods, particularly salads and seafood, should be avoided. Fruits that are peeled just before eating and carbonated drinks without ice are usually safe. The importance of bottled or boiled water sources must be stressed. The water source for refilling the ship's drinking water supply should be carefully checked in foreign ports.

Following these precautions will provide protection not only from cholera but also from other illnesses transmitted by contaminated foods, such as typhoid fever and traveler's diarrhea.

Several *cholera vaccines* exist. Their usefulness is limited because the protection that they provide is incomplete and short-lived. Cholera vaccination is not recommended for travelers, and no country currently routinely requires cholera vaccination for entry. However, vaccine may be required when going from an endemic or epidemic area to another country. In the future, new and more effective cholera vaccines may be developed; updated information can be obtained from health authorities.

DENGUE FEVER (BREAKBONE FEVER)

Incubation Period: 3 to 15 days (usually 4 to 6 days).

Isolation Period: 5 days after onset or until fever abates, in a screened room or under a bednet.

Dengue fever is an acute viral disease that is transmitted by the bite of an infective *Aedes* mosquito. *Aedes aegypti*, a highly domesticated urban mosquito, is the principal vector. In tropical forests of Asia and Africa, other mosquito species are

involved in transmission. For the virus to be transmitted, the following sequence of events must take place:

- female mosquitoes feed on the blood of an infected person from 1 to 2 days before the person's illness began to 5 days after onset of illness
- the virus develops in the mosquito tissues for 8 to 12 days
- the female mosquito transfers the virus to susceptible persons when it feeds

Ae. aegypti, is a mosquito species that bites during the day. Its two peaks of biting activity are in the early morning for a few hours after daybreak and in the late afternoon for several hours before dark. It may bite all day long on overcast days, as well as in the shade and indoors, where it is frequently found.

The incidence of dengue fever has increased dramatically in the past 20 years. Its geographic distribution includes most tropical areas of the world. It is caused by four closely related viruses (DEN-1 through 4), all of which cause a similar illness ranging from mild, undifferentiated fever to severe and sometimes fatal hemorrhagic disease called dengue hemorrhagic fever (DHF).

Dengue fever is characterized by a sudden onset of fever, which may rise to 102^{o} to 105^{o}F (38.8-40.5^{o}C), headache, eye pain, backache, bone and joint pain, weakness, and malaise. Nausea and vomiting are common. Some patients have a blotchy rash, flushing, conjunctivitis, taste aberrations, loss of appetite, and abdominal pain. Fever and associated symptoms may last for 3 to 5 days, followed by complete recovery. The decline in fever may be followed 1 to 3 days later by another rise in temperature and associated symptoms (saddleback fever). A second rash, varying in form, may appear with the first decline in temperature. Mild to severe bleeding may occur from the nose, gums, gastrointestinal tract, and skin. Depression and weakness may occur during convalescence. Many cases of mild or subclinical dengue occur, but dengue infection may also appear as a severe and sometimes fatal hemorrhagic disease, DHF.

Patients with DHF generally have a similar acute illness, with sudden onset of fever, headache, nausea, vomiting, myalgias, abdominal pain, and sometimes a rash. The fever may go down in 3 to 5 days and at that time, the patient may develop internal or external bleeding, or both, including bruises on the skin, "coffee grounds" vomitus, tarry stools, and nose and gum bleeding. In some cases, the only bleeding is internal, with the loss of plasma from the blood vessels. In these cases, the patient may be severely dehydrated, with a weak, rapid pulse. The patient may become restless and/or lethargic, have cold clammy skin, and, in some cases, may go into shock and die if the disease is not properly diagnosed and treated.

Although no specific therapeutic treatment exists for dengue and DHF, symptoms can be alleviated. Complete bed rest in isolation in a mosquito-proof area and good nursing care are necessary. Fluids should be forced to prevent dehydration. In severe cases, fluids should be administered intravenously.

Fever and pain can usually be controlled by acetaminophen. Aspirin should not be given because it may increase bleeding tendency. High fever should be controlled by applying cold compresses to the head and sponging the body with cool water. For severe pain, acetaminophen, 650 mg, with 30 mg of codeine sulfate should be given by mouth every 4 hours as needed. If additional codeine appears to be needed after four or five doses, obtain medical advice by radio.

Dengue infection results in long-lasting immunity to the infecting virus serotype (but not to the other serotypes). Patients can have three, possibly four, dengue infections with different serotypes in their lifetime. Differentiating dengue infections from other viral infections (such as measles, rubella, enterovirus infections, and influenza) and the early phases of some parasitic (malaria) and bacterial (typhoid, leptospirosis, scarlet fever) and rickettsial illnesses is difficult without specific laboratory tests. Obtain medical advice by radio if a person is ill with suspected dengue aboard ship.

Dengue fever may occur in epidemic and endemic (sporadic or silent transmission) form. Prevention and control of the disease is based solely on mosquito control and on preventing mosquitoes from biting both infected and noninfected persons. Currently, an experimental vaccines to prevent dengue fever is undergoing tests..

Patients should be kept under mosquito netting for at least 5 days or until the fever has abated.

Persons visiting areas where dengue occurs (most tropical areas of the world) can decrease the risk of infection by wearing clothes that cover the whole body and by using mosquito repellents on exposed skin and on clothing. The most effective repellents for use on skin contain at least 20% N,N diethylmetatoluomide (DEET), most of which are effective for about 2 hours if used properly. Repellents containing permethrin or DEET may be used on clothing. These products are usually sold as an aerosol and can be sprayed directly on the clothes.

DIPHTHERIA

Incubation Period: 2 to 5 days.

Isolation Period: 14 days after onset.

Diphtheria is a serious acute infectious disease that is caused by the *Corynebacterium diphtheriae* bacillus. The bacteria grow in the throat, nose, or windpipe and give off a toxin (poison) that causes an illness of the entire body.

Diphtheria once was a very common cause of sickness and death among infants and children, but it is now a rare disease in the United States. It may be prevented by diphtheria toxoid injection with booster doses every ten years. Most crew members have been inoculated as children. Crew members should be checked to assure that booster doses have been maintained.

Early symptoms of diphtheria include: overall body discomfort, restlessness, weakness, loss of appetite, headache, and chills. Sore throat with fever to 103°F (39.4°C), prostration, vomiting, and convulsions may develop in some cases. Dirty gray patches of an adherent membrane form in the back of the throat and in the windpipe itself. These patches resemble dead skin and when brushed, come away with difficulty leaving tiny bleeding points in the uncovered mucous membrane. There may be a bloody nasal discharge and a "croupy" cough.

The most serious complications include suffocation, due to the mechanical blocking of the windpipe by the diphtheritic membrane, and an overwhelming systemic poisoning due to the toxin. Because of special affinity for certain nerves, the toxin may produce paralysis of the throat, eyes, or extremities; or death from heart failure. This may occur several weeks after the initial infection.

Treatment

If diphtheria is suspected, strict isolation and bedrest is adviced. Gargles of warm salt water may help to ease pain in the throat.

Although antibiotics are considered to have little effect on the clinical course of diphtheria, treatment with penicillin or erythromycin can kill the diphtheria bacteria. If diphtheria is confirmed, the entire crew should report to health authorities at the next port.

GASTROENTERITIS/DIARRHEAL ILLNESSES

Diarrheal disease is often due to inflammation of the intestines and may be referred to as gastroenteritis, colitis or dysentery. Gastroenteritis is inflammation of the stomach and intestines. Inflammation of the large bowel is referred to as colitis. Dysentery usually presents with bloody diarrhea and is often of bacterial origin. These terms are often used interchangeably. Diarrheal disease is usually caused by viral, bacterial, parasitic or other agents, though it can have non-infectious causes as well. When managing these patients, emphasis should be placed on fluid support and rehydration.

Dehydration leading to coma or death may occur when extreme diarrhea is combined with vomiting or fever. This will cause a loss of water taken in and of water stored by the body. Severe dehydration may occur rapidly. In addition to the loss of water, the loss of various chemicals normally dissolved in body fluids may cause complications and death.

Useful signs in determining the cause of intestinal illness and its severity include:

- Character of stools—Are they watery? What is the color? Is there blood, odor, mucus, or pus? Are worms visible? Is it all liquid, or are there some formed pieces?
- Frequency of stools—How often does the patient pass stools?

- Signs of dehydration - Is the mouth very dry? Do the eyeballs seem unusually sunken? If you pinch the skin, does the fold return slowly to its former position?
- Other signs - Is there fever, rash on the skin, or vomiting?
- History - Prior symptoms? If so, when? For how long? Does the patient have any idea what might be causing the symptoms, i.e. eaten anything that was spoiled or that tasted odd?
- Epidemiology - Is anyone else sick? What symptoms do the patients have in common? What eating habits, especially on shore did they have in common?

Good hygiene aboard ship is necessary for the crew to meet its operations missions.

Treatment

Much diarrheal illness can be prevented. In foreign ports, drink bottled or boiled water, and avoid uncooked foods or foods that may not have had adequate refrigeration. Hot foods should be served hot. Cold foods should be served cold. Choose restaurants that seem to care about sanitation – the cleanliness of a restaurant's "head" can be a good indicator of the sanitation available to its food handlers. However, as a casual customer, it is often difficult to assess the cleanliness of a restaurant's galley.

Treatment of diarrheal disease is directed towards supportive care. The patient should be placed on bed rest and made as comfortable as possible. A liquid or low-residue diet should be given that includes soft drinks and broths containing salts. A "BRAT" (breads, raisins, rice, apples, tea) diet is often helpful if the patient can tolerate foods. Milk products should be avoided as the intestinal lining often is denuded and lacking the enzymes necessary to metabolize them.

Specific causes of diarrhea and some special treatments are outlined below:

Viruses - Many viruses present as intestinal illness. Usually, there is little or no fever. The onset of illness lasts several hours and is usually over within two or three days. The vomitus and stools are typically watery without blood or mucus. The patient often feels reasonably well in between bouts of diarrhea and vomiting.

Bacteria - Salmonella, shigella, campylobacter, yersinia, and cholera are some of the bacterial causes of dysentery. Clinically these infections can resemble viral gastrointestinal illness, although blood or mucus in the stool is more typical. Shigella may present with seizures. Salmonella may be carried in undercooked poultry, powdered eggs, powdered milk, or other food, as well as by livestock and pets. Pets may also be a source for campylobacter and yersinia. Diagnosis requires stool examination and culture.

Toxin induced food poisoning - Although staphylococcal organisms are bacteria, it is the toxin they produce that is responsible for the symptoms of food poisoning. Undercooked poultry and poorly refrigerated foods such as pastries, custards, and

mayonnaise are typical sources. Symptoms usually begin rapidly and violently within one to six hours after eating contaminated food. Profuse vomiting, diarrhea, abdominal cramps, and prostration occur.

***Campyolobacter difficille* colitis** - Referred to as *C. diff.* colitis, is another form of toxin producing colitis, and commonly follows antibiotic therapy. Antibiotics destroy normal gut flora which allows this organism to take over and multiply, producing bloody or non-bloody diarrhea. History of antibiotic use, severity of symptoms, and prolonged illness can be clues to diagnosis. Stool cultures are required to detect the toxin, and medical advice and referral are necessary.

Amebic dysentery - The only known human infectious cause of amebic dysentery is via the parasite *Entamaeba histolytica.* Amoebiasis tends to be a chronic diarrheal illness that may produce an acute colitis which is indistinguishable from bacterial dysentery. Diagnosis requires laboratory identification of the amoeba in the feces. Fever is usual. Abcesses may form in the liver or elsewhere, which may prove fatal in exceptional cases.

Other - Chronic forms of diarrheal illness can be non-ifectious such as ulcerative colitis, regional enteritis, functional/spastic colon, and malabsorption syndromes. It is beyond the scope of this text to discuss these areas. Basic medical advice should be sought by radio for any diarrheal illness that causes serious acute symptoms or persists for more than a week or two. Advice should also be sought if there is any question regarding hydration status, mentation, or lack of response to therapy. Agents that slow gut motility, such as over-the-counter or prescription anti-diarrheal medications, should be avoided unless advised medically otherwise. They cause the infectious agent to be retained in the gut and can lengthen the infection and increase its severity.

HEPATITIS, VIRAL

Hepatitis is an inflammation of the liver that results in acute and chronic forms of disease. Many agents cause hepatitis including viruses, drugs, alcohol, and other non-viral infectious diseases. It is important to exclude non-viral causes of hepatitis since their treatment differs. This discussion will focus on viral causes of hepatitis (hepatitis A, B, C, D, and E). These viral agents have similar clinical presentations and require specific diagnostic tests to distinguish the causative agent in an individual patient. Hepatitis A and E virus transmission mainly occurs by a fecal-oral route via person-to-person transmission and foodborne outbreaks. Hepatitis B, hepatitis C, and the hepatitis delta agents are transmitted by percutaneous and mucous membrane exposures to infectious blood and other body fluids.

Acute hepatitis implies a condition lasting less than 6 months, with either complete resolution or rapid progression toward necrosis and death. The most frequent symptoms of acute viral hepatitis are fatigue, muscle pains, nausea, and absence of appetite, which typically develop 1 to 2 weeks before the onset of *jaundice*. The frequency of jaundice varies by type of viral hepatitis and age of patient. Patients

may note yellowing of the skin or eyes, dark brown urine and/or clay-colored stools. Headaches, joint pains, vomiting, and right-upper-quadrant tenderness are also common. Diarrhea often occurs in children, but is unusual in adults. Physical exam may reveal jaundice and enlargement of the liver or spleen. Lymph node enlargement is not a clinical feature and may be suggestive of other disease.

Chronic hepatitis is defined as an inflammation of the liver lasting longer than 6 months. It may be asymptomatic for years. Over time it can develop into serious liver disease or liver cancer. Patients who are chronic carriers can spread the disease to others. Hepatitis A and E are not known to cause chronic hepatitis. Hepatitis B plus or minus the hepatitis delta agent, and hepatitis C typically cause chronic hepatitis.

HEPATITIS A (HAV)
(Infectious hepatitis, epidemic jaundice)

Incubation Period: 15 to 50 days, depending on dose; average 28.

Isolation Period: None. Standard (universal) precautions for 7 days after the onset of jaundice. Note: the patient is most infectious before they are sick.

Hepatitis A virus (HAV) is transmitted mainly by the fecal-oral route, most commonly by direct person-to-person contact. HAV can survive prolonged periods in the environment, resulting in food and waterborne epidemics. Foods touched by human hands after cooking, uncooked foods and raw or undercooked shellfish are commonly associated with outbreaks.

Acute hepatitis A may be symptomatic or asymptomatic. Children are often without symptoms but they can still spread disease to others via their stool. Adults usually present with features of acute hepatitis. Severity of illness varies and most commonly presents as a mild flu-like illness lasting 1 to 2 weeks. Rarely, it may present as a severely disabling illness lasting several months. Complete recovery without complications or recurrences is typical. The case fatality rate is low (< 1%).

Because clinical signs and symptoms are similar to those of other types of viral hepatitis, serologic detection of specific antibody responses to HAV is necessary to confirm the diagnosis. Medical referral is indicated to evaluate patients suspected of HAV infection.

Treatment

Most patients with hepatitis A have a self-limited course of illness, and no specific treatment is indicated except supportive care with bed rest. Medications (i.e. acetaminophen) should be prescribed with caution due to risk of further liver damage and drug toxicity. Hospitalization may be necessary if the patient becomes severely dehydrated or develops fulminant hepatitis.

Prevention

Hepatitis A vaccine is safe and effective, and is recommended for persons at high risk of exposure. The vaccine is given in two doses, 6-12 months apart. Hepatitis A

vaccine offers long-term protection when used as pre-exposure prophylaxis. Immune globulin is sometimes indicated as well.

Hepatitis A prevention measures include good hygiene and sanitation to prevent transmission. Thorough hand washing practices and proper food preparation reduces the risk of transmission. Maximum infectivity occurs 2 weeks prior to onset of symptoms and continues for several days after the onset of jaundice. Standard (universal) precautions should be used. Patients are not usually infective more than 7 days after jaundice occurs. Crew may return to work 7 days after the onset of jaundice. Passive prophylaxis of contacts with immune globulin (IG) is no longer recommended routinely.

HEPATITIS B (HBV)

(Serum hepatitis, Australia antigen hepatitis)

Incubation Period: 45 to 160 days, average 120 days.

Isolation Period: None. Standard (universal) precautions should be used. Patients may be infective weeks before onset and weeks to months following acute clinical illness. Check hepatitis B surface antigen (HBsAg). Chronic carriers will remain infective indefinitely, often life-long.

Hepatitis B virus (HBV) is transmitted primarily by percutaneous and mucous membrane exposures to blood and other infectious body fluids. Such exposures include transfusion of blood products, sharing needles during injection drug use, dialysis, acupuncture, tattooing, and needlesticks or injuries from sharp instruments sustained by health care personnel. Indirect inoculation via inanimate objects can occur since HBV can survive for prolonged periods in the environment. Sexual transmission usually results from mucous membrane exposures to blood or body fluids. HBV is not transmitted via contaminated food or water, nor by casual personal contact.

Acute hepatitis B resembles other forms of viral hepatitis and cannot be distinguished based on history or physical exam. Acute hepatitis B is symptomatic in only 10% of children and 30-50% of adults, but may lead to severe complications in these patients. The risk of developing chronic infection varies inversely with the age at infection. Chronic HBV infection occurs in only a small proportion of infected adults (3% - 10%), but more frequently in children (20% - 30%) and commonly in neonates (90%). Chronic HBV infection is often asymptomatic or may have a mild course, but may lead to cirrhosis and liver cancer over many years.

The course of acute hepatitis B is usually divided into an incubation period, pre-icteric, icteric, and convalescent phases. During the incubation period no symptoms are noted, although virus replication is occurring. The pre-icteric phase, typically lasting less than a 1 week, is characterized by the gradual onset of malaise, nausea, right-upper-quadrant pain, and lack of appetite. Fever may be absent or mild. With the onset of the icteric phase, symptoms worsen and dark urine and jaundice appear. This phase may last a few days to several months. Itching and pale stools usually

occur after the onset of jaundice. Weight loss of 2 to 10 kilograms is typical. The convalescent phase begins with the resolution of jaundice and, while complaints of fatigue may persist for months, complete recovery is typical. However, some patients become chronic life long carriers.

Patients who have symptoms or a potential history of exposure suspicious for HBV infection should be referred for appropriate medical evaluation and testing once in port, sooner via radio if medically indicated. Blood tests are available to identify hepatitis viruses and can distinguish past exposure from active infection.

Treatment

No specific therapy exists for acute hepatitis B. There are various approved treatments for chronic hepatitis B carriers and clinical trials are testing other regimes. Standard (universal) precautions should be followed for patients with acute or chronic HBV infection.

Preexposure immunization of susceptible persons with hepatitis B vaccine is the most effective means to prevent HBV transmission. Postexposure immunoprophylaxis with hepatitis B vaccine and HBIG may protect against infection after exposure.

Detailed advice on preexposure and postexposure immunoprophylaxis is provided by the Advisory Committee on Immunization Practices (ACIP) of the U.S. Public Health Service and is on the Centers for Disease Control and Prevention website at http://www.cdc.gov/.

DELTA HEPATITIS (HDV)

(Viral hepatitis D, Hepatitis delta virus, Delta agent hepatitis, Delta-associated hepatitis)

Incubation Period: About 2 to 8 weeks as a superinfection; requires HBV as a coinfection.

Isolation Period: *S*ame as that for HBV. (See above).

Hepatitis delta agent (HDA) is an incomplete virus requiring the helper function of HBV to replicate. Therefore, HDA causes hepatitis but only in conjunction with HBV. HDA can be acquired mainly via sexual transmission as a coinfection with HBV or as a superinfection of chronic HBV carriers. Delta hepatitis may be self-limiting or may progress to chronic hepatitis. Onset of HDA infection is usually abrupt with signs and symptoms resembling those of hepatitis B but the disease may be clinically more serious. No specific therapy exists for acute Hepatitis D. Coinfection with HDA and HBV can be prevented with either HBV preexposure or postexposure prophylaxis since HDA replication is dependent on HBV. No existing products prevent HDA superinfection.

HEPATITIS C (HCV)

(Formerly called post transfusion non-A non-B hepatitis)

Incubation Period: 2 weeks to 26 weeks, average 6 to 7 weeks.

Isolation Period: None. Standard (universal) precautions should be used indefinitely. Hepatitis C virus (HCV) RNA persists indefinitely in more than 85% of infected persons.

Approximately 70 - 90% of parentally transmitted non-A, non-B hepatitis has been attributed to HCV. Transmission of HCV occurs by percutaneous exposure to infectious blood. Today, with testing of the blood supply, most new infection is prevented. Many people who received transfusions in the past are infected. Sharing IV needles remains a common source of infection.

Groups at high risk include injection-drug users, hemophiliacs, hemodialysis patients, persons with high-risk sexual behaviors, or those with sexual or household exposure to HCV carriers, and health care workers. Perinatal transmission of HCV can occur, but breast-feeding does not play a common role in transmission. There is no evidence that HCV is transmitted through exposures as sharing meals or eating utensils, sneezing or coughing, or other casual contact.

HCV may present asymptomatically. Mild gradual complaints typical of hepatitis may be characteristic though jaundice itself only presents in about one fourth of cases. Fulminant fatal cases rarely occur. More than 85% of people with acute HCV infection become chronically infected, and the majority of these develop chronic liver disease with persistently elevated liver enzymes.

Because clinical signs and symptoms are similar to those of other types of viral hepatitis, specific serologic tests for antibodies to HCV are required to establish a diagnosis of hepatitis C.

HEPATITIS E (HEV)

(Enterically transmitted or epidemic non-A non-B hepatitis, fecal-oral non-A non-B hepatitis)

Incubation Period: 15 to 64 days; mean incubation ranges of 26 to 42 days have been reported.

Isolation Period: None. The period that HEV is shed in the stool is unknown, and the role of person-to-person contact is not well defined. Standard (universal) precautions are appropriate.

Hepatitis E is a self-limited, acute disease similar to hepatitis A in that it only presents acutely (no chronic state exists) and it is transmitted via the fecal oral route. Good sanitation and hygiene are critical in its management. No specific therapy exists. There is no vaccine against it.

Treatment

New and experimental treatments are available, especially for chronic carriers.

INFLUENZA (FLU)

Incubation period: 1 to 3 days.

Isolation period: None.

Influenza is an acute respiratory illness caused by influenza type A or B viruses. Typical manifestations include fever, cough, sore throat and coryza, accompanied by headache, muscle and joint aches and extreme fatigue. Influenza outbreaks usually occur during the winter months except in tropical or subtropical areas where influenza outbreaks can occur at any time of year.

Influenza is easily transmitted by airborne spread. In closed, crowded spaces, infection can spread quickly. The most severe symptoms typically occur over 2 - 4 days and frequently require bedrest. Medical complications such as pneumonia can develop, especially in debilitated patients. Even uncomplicated influenza can present a serious problem aboard ship because of the disruption of normal activities.

Treatment

Treatment of influenza is generally symptomatic. Acetaminophen or non-steroidal anti-inflammatory agents can be used to reduce fever and aches. Aspirin therapy should be avoided. Cough suppressants are commonly used since influenza is frequently accompanied by a dry, hacking cough. Isolation of patients can reduce the spread of infection; however, patients can shed virus before the onset of symptoms, and the spread of influenza infection in closed settings can be very difficult to control.

Prevention

Immunization with influenza vaccine is the primary method of prevention. Currently available "killed virus" influenza vaccine is administered in the fall each year and has been found to be 70-90 % effective. New vaccine is developed and administered annually since the predominant strains of virus change. Persons at highest risk who should be immunized include:

- persons age 65 yrs or older and those any age who have certain chronic health conditions
- health care providers and household contacts of persons at high risk
- military personnel to prevent disruption of activities during epidemics
- students living in dormitories because of close living conditions

Though not specifically identified in recommendations, a ship's crew should also consider vaccination due to the risk of spread when underway.

LEGIONNAIRES' DISEASE (LEGIONELLOSIS)

Incubation period: 2-14 days.

Isolation period: None.

Legionnaires' disease is a common type of pneumonia caused by *Legionella* bacteria. The disease tends to occur in the elderly, smokers, persons with chronic disease of the lung, kidney, and heart or those who are immunosuppressed.

Symptoms often include fever, shortness of breath, cough, chest discomfort, weakness, headache, confusion, and diarrhea. Illness can range from gradual malaise, muscle aches, loss of appetite, and low grade fever to explosive high fever and respiratory failure developing within 24 hrs. The illness can be quite serious and up to 15% of cases end in death.

Legionnaires' disease is not spread from person-to-person. Most illnesses occur as a result of inhalation of aerosols or mists containing *Legionella* within water droplets. such as from air handling systems Only a small proportion of those exposed to contaminated aerosols during outbreaks develop illness.

Treatment

Antimicrobial treatment, given early in the course of illness, can substantially reduce the risk of serious complications. Antibiotics such as fluoroquinolones (ciprofloxacin), erythromycin, or azithromycin are used for treatment.

Medical referral and hospitalization should be strongly considered in patients with pneumonia, particularly if there are signs of respiratory distress. Intravenous fluids may be required if the patient is dehydrated.

Prevention

The potential for transmission of Legionnaires' disease can be reduced by methods which include mechanical and biocidal cleaning of cooling systems and evaporative condensers according to manufacturers' specifications, maintenance of continuous chlorine levels within potable water systems of 1-2 µg/ml (free residual chlorine), daily hyperchlorination, maintenance of continuous halogen (chlorine or bromine) levels, and filter maintenance and replacement, according to interim guidelines of the Vessel Sanitation Program of the United States Public Health Service at http://www.cdc.gov/, daily changing of water within humidifier reservoirs, and periodic hyperchlorination of fountains.

MALARIA

Incubation period: 7-28 days.

Isolation period: None.

Malaria transmission occurs on every continent in subtropical and tropical regions. The World Health Organization estimates that malaria infection affects from 300 to

500 million people, and is responsible for over 1.5 million deaths each year. Disease in humans is caused by one of four parasites called *Plasmodium* (*falciparum, vivax, ovale and malaria*e). *Plasmodium falciparum* causes the most severe infections, and greatest number of deaths. The use of drugs and personal protective measures can prevent mosquito bites and infection. Although treatment can prevent deaths by all types of malaria, prevention is the best approach.

Transmission of malaria occurs in Central and South America, Haiti, Dominican Republic, sub-Saharan Africa, Middle East, Indian subcontinent, Southeast Asia, and Oceania. *P. falciparum* has developed resistance to chloroquine, a drug widely used to both prevent and treat malaria in many areas. *P. vivax* has developed resistance to chloroquine on the island of Papua New Guinea. Check current recommendations for specific travel areas before prescribing prophylaxis.

Infection results from a bite from an infected female *Anopheles* mosquito which injects parasites when it takes a blood meal; these enter human liver cells. After one to two weeks of development, blood stage parasites burst from liver cells, enter the blood, and invade red blood cells. Asexual reproduction occurs in red blood cells, forming many more parasites. The red blood cells rupture releasing more parasites, which then infect more red blood cells. This continuous cycle causes symptoms of malaria illness and destruction of red blood cells.

Some parasites develop into gametocytes, which a mosquito ingests during a blood meal. The gametocytes undergo sexual reproduction in the mosquito stomach, creating more parasites (sporozoites). After 1-5 wks, the sporozoites migrate to the salivary glands of the mosquito, and can be injected into a person via a bite, which continues the cycle.

Malaria infection may lead to a mild illness characterized by flu-like symptoms, or to severe, rapidly progressive, fatal disease. The most common symptom of malaria is fever. Other symptoms can include malaise, muscle aches, backaches, sweats and chills, nausea, vomiting, abdominal pain, diarrhea, loss of appetite, dry cough and shortness of breath. Untreated *P. falciparum* infection may lead to severe complications of cerebral malaria (mental disturbances, seizures, coma, and death), anemia, kidney failure and respiratory failure.

Treatment

Symptoms may vary with the infecting species, immunity from previous infections, and whether a drug was used to prevent infection. The wide range of symptoms can make malaria difficult to differentiate from many other diseases. Any person with fever or other symptoms of malaria who has been in an area with malaria transmission requires immediate treatment if professional medical care is not available within 24 hours. The disease, if missed and allowed to progress, can cause death despite treatment late in the course. The index of suspicion for malaria should be high. Any individual with evidence of the complications listed above should be considered as having a severe and life-threatening infection requiring immediate treatment.

Medical advice by radio should be obtained for each patient with suspected malaria. Treatment regimens vary and are dictated by the area of malaria acquisition and drug resistance. If the area of infection cannot be determined, treatment should assume chloroquine resistance.

Prophylactic medication is critical for all individuals going to areas with malaria transmission. The specific medication is geographically specific. Personal protective measures against mosquitoes are also essential.

The nocturnal feeding habits of *Anopheles* mosquitoes lead to the transmission of malaria primarily between dusk and dawn. The use of personal protective measures to avoid mosquito bites especially during this period can provide additional protection against malaria. Measures that individuals can take to provide protection against bites of *Anopheles* mosquitoes include:

- wearing clothing that covers most of the body
- using insect repellant that contains N,N diethylmethlyltoluamide (DEET) by application to clothing and exposed skin
- sleeping under mosquito netting (bednet), which if available, is more effective if treated with an insecticide (permethrin or deltamethrin)
- staying in screened or air-conditioned areas

The appropriate use of prophylactic medications and personal protection measures will reduce the malarial risk for those going to malaria-endemic areas. However, because preventive measures are not completely effective, an ill person who has been in a malaria endemic area should be evaluated for infection.

MEASLES (RUBEOLA)

Incubation Period: 8 to 13 days, sometimes more.

Isolation Period: From diagnosis until 7 days after the rash appears.

In the U.S. measles is largely prevented by vaccination.

Measles, an acute viral disease, is among the most contagious of all communicable diseases. The virus is found in secretions of the nose, mouth, throat, and lungs of infected persons. Many adults have had the disease in childhood, and one attack provides lifelong immunity. Complications include diarrhea, pneumonia, ear infection, and inflammation of the brain (encephalitis). In unvaccinated populations in developing countries measles is a leading cause of pediatric deaths.

Symptoms begin within 2 wks of exposure. Onset is sudden with a general overall feeling of illness, sneezing, runny nose, headache, sore throat, cough, soreness of the eyes, dislike of bright light, and a rise in temperature to about 102^{o}F (38.8^{o}C). Copious tears, swollen lids, and bloodshot eyes may be present. During this early stage the disease is most contagious. On the second and third day symptoms become more marked and the face gets a puffy look. On the inner side of the

cheeks, where the back teeth meet, tiny whitish spots (Koplik's spots) may be seen. The patient now should be isolated, if not already done. After 3 - 5 days of the disease, the typical measles rash appears. The rash of a reddish hue with slightly raised irregular blotch patches starts on the forehead and behind the ears, and gradually spreads to the face, body, and limbs. The rash remains about 4 - 5 days, then fades in the same sequence that it appeared. This is followed by a fine peeling of the skin. As the rash disappears, the patient becomes non-infectious and the temperature drops to normal. The diagnosis may be confirmed by a serologic testing once in port.

Treatment

Because of its extremely infectious nature, measles usually spreads to crewmen who are not immune from vaccine or past infection. A patient with measles should be isolated to reduce the chance of spread. Treatment is symptomatic, as there is no specific medicine that will cure measles. Medical advice by radio should be obtained.

Fluids should be encouraged. Close attention should be paid to cleanliness of the mouth and teeth. The eyelids and margins should be cleansed several times a day with sterile isotonic eye irrigating solution. If the rash causes irritation or itching, calamine lotion may be applied. Cough should be treated symptomatically and acetaminophen (650 mg by mouth every 6 hours) or ibuprofen given for headache or fever. During convalescence one should watch for complications and secondary infections. The patient should not engage in anything but the lightest tasks for two or three weeks after the attack. At the first convenient port, he or she should be referred to a physician for a medical checkup.

MEASLES, GERMAN (RUBELLA)

Incubation Period: 12 to 23 days (rash 14 to 17 days after exposure).

Isolation Period: 7 days after onset of rash.

German Measles usually is a mild, acute, highly infectious viral disease, sometimes called three-day measles. If a woman develops German Measles during the early months of pregnancy, there is a great risk of a spontaneous abortion, stillbirth, or the child may be born with birth defects. Since the wide use of rubella-containing vaccine, the number of cases in the United States have decreased to a couple of hundred per year, and most cases occur among unvaccinated young adults.

In the week preceding rash, older children and adults may have low-grade fever, malaise, symptoms of upper respiratory infection, and swelling and tenderness of lymph nodes in the neck, especially behind the ears. A pink rash, which begins on the face and moves to the trunk, lasts about 3 days.

While some symptoms may precede the appearance of the rash, others may accompany or follow the onset of rash. There may be a general feeling of bodily discomfort, headache, symptoms of a common cold, eye soreness, stiffness of joints,

and a slight fever, about 102°F (38.8° C). The temperature may go to 104°F (40°C). The temperature will drop to normal as the rash fades.

Treatment

There is no specific therapy for German Measles. In most cases, rubella is a very mild illness and requires no treatment. Patients with fever and/or joint pains should be treated for symptoms with ibuprofen or acetaminophen. The patient should be encouraged to drink plenty of fluids.

Prevention

Rubella vaccine is a live attenuated vaccine commonly given in combination with the measles and mumps vaccines (MMR). It is contraindicated to give this vaccine during pregnancy and with significant immunosuppression. (Patients with HIV may be vaccinated if the benefits do outweigh the risks.) The vaccine is contraindicated for those sensitive to neomycin. Side effects of low-grade fever, rash and arthralgias are common when this vaccine is give to adults who are nonimmune.

MENINGOCOCCAL DISEASE

Incubation Period: 1 to 10 days, most commonly less than 4 days.

Isolation Period: Routine isolation for the first 24 hrs of therapy and prophylaxis of household contacts as described below.

Infections caused by the gram-negative bacterial pathogen *Neisseria meningitidis*. *Neisseria meningitidis* causes a variety of clinical syndromes but is most often associated with meningitis and a distinctive, severe sepsis called meningococcemia. Transmission of disease is person-to-person via respiratory secretions.

Fever, headache, and stiff neck are the most common symptoms in patients presenting with meningococcal meningitis; alteration in mental status may also occur, and patients may have a rash. Acute onset of fever, rash, and prostration are the principal manifestations of meningococcemia. Onset of rash may be quite abrupt and the patient appear quite toxic. The rash itself may be petechial (pink dots), purpuric (look like diffuse bruises or blueberry muffin), or macular (larger pink rash difficult to distinguish from other viral rashes). Meningeal inflammation may be manifested by Kernig's sign and/or Brudzinski's sign. Kernig's sign is resistance to passive extension of the leg when the hip is flexed while supine. Brudzinski's sign is spontaneous flexion of hips and knees with passive flexion of the neck.

Elevation of white blood count with a predominance of polymorphonuclear leukocytes on differential count is the most common abnormality on routine laboratory evaluation. Signs and symptoms of meningococcal meningitis are indistinguishable from those of acute meningitis caused by *Haemophilus influenzae* and *Streptococcus pneumoniae*. For a definitive diagnosis, the patient must be taken to a health center for a lumbar puncture. It is critical that a lumbar puncture only be

performed with full sterile technique, and that the cerebral spinal fluid specimen that is collected be sent to a reputable laboratory. Further, a lumbar puncture generally should NOT be done if there is evidence of increased intracranial pressure on physical exam, i.e. papilledema on fundoscopic examination.

The lumbar puncture should be performed to obtain cerebrospinal fluid for culture (blood cultures will also often be positive and therefore should be done if possible), antigen detection, Gram's stain, cell count with differential, protein, and glucose to confirm the diagnosis and identify the cause. Cerebrospinal fluid in patients with meningococcal meningitis generally shows abundant white blood cells (1000-5000/mm^3) with a differential of predominantly polymorphonuclear leukocytes ($\geq$ 80%), elevated protein (100-500 mg/dl), and decreased glucose ($\leq$ 40 mg/dl); however, these findings may vary, particularly in patients with partially treated meningitis.

Treatment

Meningococcal disease is life-threatening. Get immediate shore advice on specific antibiotic regiments.

Since survival of patients with meningococcal disease depends on timely recognition and appropriate treatment, antibiotics should be administered promptly based on clinical suspicion. Appropriate diagnostic procedures should be performed, but treatment should not be delayed.

Choice of antibiotic is based on the most likely causative bacteria. A strong, broad-spectrum agent is used until the causative bacteria have been identified. High dose penicillin G should be administered intravenously (20 to 24 million units per day in adults) every 4 to 6 hours; some of the newer intravenous cephalosporins, notably ceftriaxone, cefuroxime, and cefotaxime have also been shown to be effective in treating meningococcal meningitis. High-level penicillin resistance due to β-lactamase production has been reported among strains from Spain and Southern Africa. If penicillin resistance is suspected, other antibiotics should be used. Respiratory isolation is indicated for 24 hours after initiation of effective therapy. Seven to 10 days of treatment is usually sufficient.

Prevention

The risk of meningococcal disease in close contacts of patients with meningococcal disease is 500 to 1000 times the risk in the general population. Antibiotic prophylaxis is recommended as soon as possible for close contacts of patients, including shipmates, household members, day care center contacts, and anyone directly exposed to the patient's oral secretions. Casual contacts and hospital personnel providing routine care are not at increased risk and do not require prophylaxis. Contact a shore physician for the best specific antibiotic and dose for your situation.

Vaccination is the main public health tool available to control outbreaks. The currently licensed meningococcal vaccine provides protection against disease

caused by *N. meningitidis* serogroups A, C, Y, and W135, but not serogroup B. The vaccine is also recommended for asplenic persons and persons with complement deficiencies. Travelers to areas with high endemic rates or areas susceptible to epidemics may benefit from vaccination prior to travel. Except for military personnel, meningococcal vaccine is not routinely recommended in the United States because about half the meningococcal disease is caused by serogroup B, for which no vaccine is currently available. Further, in the U.S., more than half the cases occur in children under age 4, in whom the duration of protection conferred by available vaccines is limited.

MONONUCLEOSIS, INFECTIOUS

Incubation period: 21 to 42 days.

Isolation period: None.

Infectious mononucleosis is an acute viral disease, caused by Epstein-Barr virus (EBV), and characterized by fever, sore throat (often with exudative pharyngitis), and lymphadenopathy. It occurs among children and young adults and may be a diagnostic challenge if the typical syndrome is not present, which is often the case. It occurs sporadically and is common among college and high school students. One should have a low threshold of suspicion when testing for “mono,” i.e. anyone with a prolonged sore throat not responsive to medical intervention should probably be screened. Because it is spread by contact with upper respiratory secretions, it has been called the "kissing disease".

The first symptoms are similar to any upper respiratory infection: with fever, chills, headache, cough, and general malaise. The patient may have complaints of fatigue, loss of appetite, sleeplessness, and a sore throat. After two to three days, swollen lymph glands may appear on the sides and back of the neck, in the armpits, and the groin. A mild reddish skin rash like that of Rubella (German Measles) may occur in about 10% of the cases, but particularly those treated with a penicillin-related drug. Enlargement of the spleen is noted in 50% of young adults, and jaundice (yellow color) of the skin and eyes in about 4%.

The diagnosis is aided by finding lymphocytosis of greater than 50% with 10% or more atypical lymphocytes on a peripheral blood smear. It is serologically confirmed by heterophile and Epstein-Barr virus blood tests.

Treatment

Medical advice by radio should be obtained for acutely ill patients. There is no specific treatment for infectious mononucleosis except bed rest during the acute phase. Bed rest should be extended in cases with prolonged fever and those that resemble hepatitis. Robust exercise should be avoided by any cases with abdominal pain or tenderness, which may be associated with enlargement of the spleen, to reduce the possibilities of rupture. Symptoms such as fever, headache, and itching

of the skin, should be treated as they arise. The disease may run its course in a week, in a few weeks, or more rarely, in months.

A normal diet may be given, but taking fluids by mouth should be encouraged. For fever and pain, acetaminophen may be given orally. Complications should be treated as recommended by radio medical advice.

MUMPS (EPIDEMIC PAROTITIS)

Incubation Period: 12 to 26 days.

Isolation Period: 9 days from onset of parotitis (swelling of salivary glands).

Mumps is an acute, contagious, viral disease identified by tenderness and swelling of one or more of the salivary glands. Usually the parotid glands are affected. The virus may be spread by direct or indirect contact with nose and throat discharges from an infected person.

Mumps is most prevalent in the winter and spring. It is most apt to occur in camps, training stations, and among new members of a ship's company recruited from rural districts and never vaccinated or previously exposed to mumps. One attack usually gives immunity for life.

The disease begins with malaise, headache, a slight rise in temperature, and possibly nausea. In severe cases the temperature may reach 104°F (40°C) and last as long as a week. On the second day the swelling usually begins on one side of the jaw or cheek and increases greatly. In a couple of days, there is considerable enlargement at the side of the neck, posterior part of the cheek, and underneath the side of the jawbone. The patient complains of pain and stiffness on moving the lower jaw. The opposite side of the face usually becomes affected in a few days, though infection may occur unilaterally. The swelling lasts about 10 days.

In the average case in childhood, the patient has little trouble beyond stiffness of the jaw, discomfort from swelling, and pain on opening the mouth. However, in young adult males, the infection may spread to one or both testicles to produce a painful inflammation and swelling called orchitis. Some degree of testicular atrophy is common, but sterility is rare.

Treatment

The patient should have bed rest with strict isolation nursing technique. There is no specific medicine for the cure of mumps and symptoms should be treated as they arise. Analgesics-antipyretics such as acetaminophen relieve pain caused by salivary gland inflammation and reduce fever. Warm or cold packs applied to the inflamed areas may relieve discomfort. Fluids should be encouraged with a soft diet.

If the testicles become involved, bedrest, narcotic analgesics, support of the inflamed testes, and ice packs may relieve discomfort. When the patient is allowed up, he should wear a suspensory. *Medical advice by radio should be obtained promptly.*

PLAGUE

Incubation Period: 2 to 6 days.

Isolation period: Until declared free from infection by a physician.

Plague is an acute, sometimes fulminating disease caused by the Gram-negative bacillus, *Yersinia pestis*. Plague is primarily a disease of rodents and is most often transmitted to humans by the bite of infective rodent fleas. Plague in the past has been a maritime disease because of rat infestation of ships.

Federal regulations require that vessels be maintained free of rodent infestation through the use of traps, poisons, and other accepted methods of rodent control. Ships must be inspected periodically by the U.S. Public Health Service and a certificate of non-rat infestation given.

Plague remains endemic in limited areas in Asia, Africa, and the Americas and occasionally results in outbreaks of disease. Outbreaks of human plague are usually associated with outbreaks (epizootics) of the disease in rats or other rodents.

Three principal clinical forms of human plague occur: the bubonic type that affects the lymph glands, the pneumonic type that affects the lungs, and the septicemic type that occurs when *Y. pestis* multiplies freely in the blood.

All three forms are usually characterized by rapid onset of severe illness with high fever, chills, and prostration. Signs of general toxicity may be accompanied by neurologic signs such as incoherent speech, clouding of consciousness, and incoordination. Plague meningitis can sometimes occur.

BUBONIC PLAGUE

Bubonic plague, by far the most common form, is usually acquired by the bite of an infected rodent flea. Transmission occurs when the plague bacillus is regurgitated by the flea into the bite wound at the time of taking a blood meal. The disease may also be transmitted by direct contact with tissues or body fluids of an infected animal. Persons with cuts or abrasions on their hands are especially at risk of infection when handling infected animals. Once introduced through the skin, the bacteria lodge and multiply within the lymph nodes draining the site of introduction.

The onset of illness is usually heralded by fever, intense headache, fatigue, and profound weakness. The fever often rises to 102^{o} F (38.9^{o} C) or higher on the first day of illness, then fluctuates. The pulse is rapid, sweating and chills may occur, and the patient may experience extreme thirst. The patient often becomes anxious or agitated, and delirium and convulsions may develop. The characteristic buboes (swollen, extremely tender lymph nodes) usually develop on the second or third day of illness, most often in the inguinal (groin) area. Buboes may also form in the axillary (armpit) area and in the cervical (neck) region. The affected glands often swell to a size of 2 or more inches (5 cm) in diameter and are surrounded by edema of the soft tissues. The overlying skin is usually reddened and warm. The patient

often guards the affected region and draws away from examination because of the extreme tenderness of the node.

Untreated, more than 50% of bubonic plague patients will die. In cases that receive proper treatment, the patient usually begins to show significant improvement within 2 or 3 days of antibiotic therapy.

PNEUMONIC PLAGUE

Primary pneumonic plague, spread by respiratory droplets exhaled by coughing, talking, or sneezing, is the least common, but most serious form of the disease. The disease is probably always fatal, unless the patient is treated early with the appropriate antibiotic regimen (within 18-24 hours after onset of symptoms). Symptoms are as described above with the additional problems of cough, rapid respirations, difficulty in breathing, and cyanosis that may occur as the pneumonia advances. The sputum may be scant and blood-tinged, or may be profuse, watery, and bloody. The sputum usually contains large numbers of the plague bacillus. Patients may simultaneously develop respiratory failure, toxic shock, and clotting problems as evidenced by bleeding. Patients must be managed with isolation and full respiratory precautions. Caregivers working closely with the patient should receive antibiotic prophylaxis.

SEPTICEMIC PLAGUE

Primary septicemic plague (infection of the bloodstream) occurs in 10% or less of all cases. It usually arises from direct handling of infected tissue and fluids of infected animals. Septicemia secondary to bubonic or pneumonic plague is not uncommon, however. The patient is rapidly prostrated and may develop irreversible septic shock. Clotting problems as evidenced by bleeding are common. If not treated promptly, death often occurs in 2 to 4 days, frequently preceded by delirium, stupor, and coma.

Prevention of Spread

If the ship is proceeding to a port where plague is present, it may be advisable to protect the crew with prophylactic antibiotics. Specific advice should be obtained from the port authorities as to regulations about entering and leaving the port.

Plague is a Class 1 quarantinable disease. Should a crew member develop plague, federal regulations require that the Master, as soon as practical, shall notify the health authority at the next port of call, station, or stop, and take such measures to prevent the spread of the disease as the health authorities direct.

If *bubonic plague* occurs on shipboard, the patient should be placed in isolation. The sickroom and the crew quarters should be treated with an insecticide to kill any fleas, and general insecticiding of the ship performed. Dead rats found aboard ship should not be handled with bare hands. The dead rats should be sprayed with an insecticide to kill any fleas; then they should be picked up with a shovel or tongs, placed in a sealed plastic bag and incinerated. Efforts to rid the ship of live rats by

trapping or poisoning should not be undertaken until complete flea control has been accomplished by professional application of insecticides.

Discharges from buboes could be infectious. Disposable surgical supplies such as gauze used on the buboes should be burned or sterilized prior to disposal. Attendants should wear gowns and gloves, and wash and disinfect their hands each time after giving care.

In *pneumonic plague*, which is spread by the patient's respiratory secretions, isolation nursing technique must be strictly observed. Attendants should wear a mask, cap, gown, and gloves; these articles must be kept in the sickroom after use and disinfected at the termination of the illness. The medical attendant's hands must be washed thoroughly before leaving the sickroom. Discharges from the patient's mouth must be caught in tissue and disposed of in an appropriate manner for infectious waste material by autoclaving or incineration and articles which cannot be sterilized as per above must be boiled or chemically disinfected. At the end of the illness, the room must be disinfected.

Treatment

Radio notification of the diagnosis should be made at the first suggestion of symptoms of plague. Plans should be made to evacuate the patient to a medical facility ashore at the first opportunity after consultation with the port's health authorities.

Seek medical consultation for the specific antibiotic treatment regimen.

POLIOMYELITIS

Incubation Period: Commonly 7 to 14 days, with a range from 3 to 35 days.

Isolation Period: Enteric precautions should be used in the hospital. These are of less value under home or ship conditions because most contacts may have been infected prior to diagnosis.

Poliomyelitis is an acute viral disease that occurs chiefly in children. Adults usually are immune. It is spread by respiratory and fecal routes. Today polio is wholly preventable with two types of vaccine available: the injectable Salk vaccine (IPV) and the oral Sabin vaccine (OPV).

Polio may start with no recognizable symptoms or it may resemble a head cold with fever, vomiting, and irritability. The symptoms last about three days, and the temperature may rise to 104^{o}F (40^{o}C).

From the fourth to the tenth day the condition will seem to be clearing. However, the symptoms return with a feeling of apprehension, headache, stiff neck and back, and deep muscle pains. Varying degrees of paralysis follow. Thereafter improvement is gradual either with complete recovery or paralysis to some degree.

Treatment

No specific treatment is effective. When poliomyelitis is suspected, medical advice by radio should be obtained. The patient should be put to bed and isolation nursing technique observed. For spinal paralysis of body parts, hot moist heat may be applied, coupled with gentle, active or passive motion as soon as the patient can tolerate it. Physical therapy is used to attain maximum function after paralytic poliomyelitis and can prevent many deformities that are late manifestations of the illness.

If urine is retained, a catheter should be inserted and medical advice sought by radio. All stools are infectious, so bedpans should be disinfected.

Prevention

Both injectable and oral polio vaccines are available, though their side effect profiles differ. See current CDC recommendations at http://www.cdc.gov/.

RABIES (HYDROPHOBIA)

Incubation Period: 10 days to more than 12 months (usually under 4 months). Patients bitten about the head and those with extensive bites may have shorter incubation periods.

Isolation Period: Duration of the illness.

Rabies is an acute infectious viral disease that is almost always fatal. When a rabid mammal bites a human or other animals, its saliva transmits the infection into the wound where it spreads to the central nervous system. Rabies occurs worldwide, except in isolated regions where it has never been established, such as portions of Pacific Oceania, or in areas that have achieved secondary eradication, such as the United Kingdom. In developed countries that have controlled canine rabies, the disease is primarily an infection of wild animals such as skunks, coyotes, foxes, raccoons, mongooses and bats. In developing countries, the domestic dog is the predominant reservoir, particularly in portions of Latin America, Africa and Asia. Other domestic animals can be also infected.

Human rabies may begin with fever, nausea, headache, loss of appetite, and sore throat. The body temperature may rise to 103^0F (39.4^0C). Because these symptoms are common to other viral infections, the condition may be misdiagnosed if the patient's history does not indicate a recent bite by an animal. At the bite wound, there may be a tingling or burning feeling. As the infection progresses, extensive portions of the brain and central nervous system become involved. Paralysis and muscle spasms occur, with spasms of muscles in the mouth and throat that control swallowing. The term hydrophobia (fear of water) derives from the patient's inability to drink, regardless of thirst. Patients become very weak and their mental outlook changes. They become apprehensive, irrational, even maniacal. They may suffer from widespread muscular twitching and convulsive seizures provoked by any

stimulus, especially by attempts to drink or even air currents. The voice becomes hoarse. Thick ropy saliva may drip from the lips. Eventually there are breathing difficulties, coma, and general paralysis. The patient should be isolated and kept comfortable. Measures should be in place to prevent contact with the patient's bodily fluids, such as saliva. Little else can be done once symptoms of rabies develop. Death is virtually certain. Thus, prevention of the disease is of the utmost importance.

Circumstances surrounding the animal attack frequently furnish vital information on whether or not the use of rabies treatment is indicated. Most bites by domestic dogs and cats are provoked. If the history indicates this, usually rabies treatment can be withheld, if the animal is available for observation, and appears to be healthy over a 10 day period. However, the dog or cat that bites without apparent provocation may be considered rabid. Each case must be analyzed carefully before a conclusion can be reached on whether or not to proceed with treatment.

Domestic dogs and cats that bite a person should be captured and observed for signs of rabies for the 10 days. If signs are not present, the animal may be assumed to be nonrabid. If the animal dies or is killed, the animal's head, undamaged, should be sent promptly under refrigeration (*but not frozen*) to a public health laboratory. Observation periods do not pertain to wildlife, because the period of virus shedding is unknown. Any wild mammalian carnivore or bat that bites or scratches a person should be humanely killed at once, taking care not to damage the brain, and the head kept under refrigeration during transportation to a public health laboratory.

Rubber gloves should be worn by the attendant for protection against infectious saliva when the head is being prepared for laboratory examination. The gloves should be washed thoroughly with disinfectant solution and boiled in a sterilizer for five minutes before discarding. Finally the attendant's hands should be washed with disinfectant solution.

Treatment

Treatment of the bite wound includes both rabies-specific treatment and general wound care. Since the supplies for rabies specific treatment can be difficult to obtain, even on shore, immediate consultation with shore medical facilities are indicated. This consultation will help to assess the seriousness and likelihood of rabies risk and also begin acquiring specific treatment products if warranted. If the risk is high, immediate transport to shore of the person and animal (or refrigerated head or carcass of the animal) are essential. Laboratory evaluation of the animal and prompt treatment of the patient can be life-saving.

Immediate shipside wound care includes cleansing and irrigation to remove as many microorganisms (including rabies virus) as possible. Soap and water, or saline solution, can be used. Suturing is rarely appropriate for bite or puncture wounds since it can increase the risk of infection.

Tetanus toxoid or prophylactic antibiotics may be indicated depending upon the patient's vaccine history and the extent of the bite.

Rabies specific treatment would be done at the shore facility. The specific treatment is dependent upon the patient's rabies vaccine history and other clinical features. A series of rabies vaccine doses is frequently given.

RHEUMATIC FEVER

Incubation Period: 7-14 days.

Isolation Period: None.

Rheumatic fever typically occurs in children and young adults. A recent history history of pharyngitis is typical though the patient may have been asymptomatic. Migratory joint aches and salmon colored rash is common. Although less common, patients may present with heart problems, such as a new heart murmur, or abnormal body movements (chorea).

Epidemiologic risk factors include lower standards of living and crowding. Incidence has declined remarkably over the past fifty years in industrialized countries but still poses a significant public health problem in developing countries. An abnormal immune response to the streptococcal infection by the host is thought to be the mechanism by which disease develops.

Evidence of a recent strep throat infection is of course supportive. A positive throat culture, a rapid antigen detection test and/or elevated or rising ASO (strep antibody) titers would be tests which would be supportive, were one to have access to such studies. Diagnosis is a clinical one, based on criteria referred to as the Jones criteria. Generally one would suspect diagnosis and seek medical assistance by radio based on the following constellation of (or some of) the following symptoms:

- migratory joint pains or
- heart problems such as chest discomfort that suggest swelling,
- a new murmur, rapid heart rate, skin nodules
- migratory rash
- fever

Treatment

For adults with symptoms of acute arthritis high dose aspirin is recommended if the patient has no history of liver or kidney disease. Corticosteroid therapy has been shown to be effective but should be reserved for extreme cases under physician advisement. Antibiotic therapy should be started immediately. Penicillin is the drug of choice, either oral or IM. For penicillin allergic patients, erythromycin is an alternative.

RELAPSING FEVER (TICK-AND LOUSE-BORNE RELAPSING FEVER)

Incubation Period: 5 to 15 days (usually 8 days).

Isolation Period: None. (For louse-borne relapsing fever, the patient's clothing, immediate environment, and all household contacts should be deloused).

Relapsing fever is an acute infectious disease caused by spirochetes of the genus *Borrelia*. It is transmitted by lice and ticks. The disease is characterized by rapid onset of fever, chills, dizziness, headache, muscle and joint pains, vomiting, and at times delirium. The fever remains high for two to nine days, then ends suddenly by crisis, in which there is a further rise in fever accompanied by rigors, followed by a rapid fall in body temperature and drenching sweats. This is followed by several days of fair health without symptoms, after which a relapse usually occurs, plus jaundice in some cases. There may be three, four, or more recurrent attacks, each decreasing in severity, as immunity develops.

A sick member of the crew should be suspected of having the disease if the ship has recently been in an area where relapsing fever is prevalent, or the disease has been diagnosed in any of the crew by a shore physician. The only major focus of louse-borne relapsing fever is in Africa, primarily in the highlands of Ethiopia, but the disease also occurs in refugee populations in surrounding countries. With known relapsing fever suspects aboard, a thorough search should be made for body lice. If these are found, the crew's quarters and clothing should be treated with an insecticide, and clothing and bed coverings regularly washed.

Lice are infected when they feed on patients during the fever stage. After the lice are crushed on a person's body, the spirochetes can enter any breaks in the skin or be carried by contaminated hands that rub the eyes. Ticks become infected when they feed on rodents that carry the disease.

Treatment

Medical advice by radio should be obtained. Tick-borne relapsing fever is usually treated with tetracycline hydrochloride. Louse-borne relapsing fever is treated with erythromycin, tetracycline, or doxycycline.

SCARLET FEVER

Incubation period: 1-4 days.

Isolation period: None.

Scarlet fever consists of a streptococcal infection, usually a strep throat, accompanied by a characteristic rash. The symptoms of scarlet fever include those of a strep throat: mild to severe sore throat (sometimes asymptomatic), fever, chills, malaise, abdominal complaints/vomiting. The throat may look normal or

erythematous with a purulent exudate over the tonsils. Enlarged, tender anterior cervical lymph nodes may be palpable accompanying the infection.

The scarlet fever rash typically has a sandpaper-like quality and begins on the first or second day of illness. It spreads over the trunk to the extremities but spares the palms and soles. The rash may also be accentuated in areas of the skin folds (Pastia's lines). The tongue may have a strawberry-like appearance (strawberry tongue). The rash usually subsides within a week and is often followed within several days by desquamation of the palms and soles. It is one of few rashes affecting the palms of the hands and soles of the feet.

Treatment

Therapy is the same as for streptococcal pharyngitis: intramuscular benzathine penicillin G or a complete 10 day course of oral penicillin V, or erythromycin for those with penicillin allergy.

SHINGLES

Herpes Zoster, commonly known as shingles, is caused by the same virus that causes chicken pox. It develops in patients who have a remote history of chicken pox. Illness arises when the body is sick or stressed. The rash of shingles follows a dermatome pattern and is typically quite painful. Others can catch chicken pox from someone who has shingles. Anti-viral and pain medications are used with varying success. Medical advice by radio should be sought if the rash involves the face or if there is any concern regarding possible superinfection.

TETANUS (LOCKJAW)

Incubation Period: 3 - 21 days or more (depending on character, location, and extent of wound).

Isolation Period: None.

Tetanus can be prevented with vaccine – current vaccination is critical.

Tetanus is caused by a toxin produced by the bacillus *Clostridium tetani*, a bacterium that grows in the absence of air at the site of an injury. Tetanus bacteria are found in the intestines and manure of horses, cows, and other animals. The soil becomes seeded with spores that are hard to kill, survive for years, and are transplanted into humans or other favorable environments for growth. Tetanus bacteria commonly enter the body through wounds contaminated by debris or foreign bodies.

The wound may not show any change when initial symptoms develop; in fact it may seem to be healed. The toxin produced is carried to the central nervous system thereby producing symptoms. Early symptoms are aches and pains in the muscles, general fatigue, and headache. Soon the characteristic signs appear - stiffness of the neck and jaw that gradually extends to the muscles of the back and the

extremities. The jaw may become clenched tightly (lockjaw). The body is held rigidly straight or arched so that the patient's back may touch the bed only with his head and heels. There is such extreme nerve sensitivity that the slightest jar, touch, or noise may cause diffuse muscle spasms with agonizing pain. The temperature varies; usually it is high during the state of convulsions, rising to 103°F (39.4°C).

Treatment

If the medical attendant suspects that a patient has tetanus, immediate medical advice by radio should be obtained, therapy given as directed, and evacuation arranged. (Early contact with shore facility is necessary to arrange for this). Constant nursing care and utmost quiet must be provided to prevent the exhausting painful spasms. Sedatives and muscle relaxants such as diazepam should be given as directed. During convulsions the jaws should be separated with a pencil wrapped in gauze to keep the patient from biting his tongue. Fluids should be encouraged if so directed medically. Regulations require that the Master, as soon as practical, notify the local health authority at the next port of call, station, or stop that a tetanus case is aboard ship. The Master should take such measures as directed by the local health authority.

Prevention

Vaccination against tetanus is essential. This vaccine is often combined with diphtheria toxoid (tetanus and diphtheria toxoids for adult use). Every seaman should obtain his or her primary vaccinations, with booster shot every 10 years. An additional vaccination may be indicated immediately following a severe dirty laceration or wound.

TUBERCULOSIS

Incubation Period: Variable, from 10 weeks to years.

Isolation period: Isolation should be discontinued only after the patient has been evaluated, treated, and declared noninfectious by a physician.

Tuberculosis (TB) is an infectious disease caused by bacteria called *Mycobacterium tuberculosis*. TB can attack any part of the body, but most commonly causes lung disease. Bacteria are expelled into the air by a person with active TB and patients are most infectious when they have a cough. A healthy body is usually able to control the tubercle bacilli. Therefore most persons who become infected with *M. tuberculosis* do not develop active TB, remaining latently infected throughout their lives. As long as persons with latent TB do not have any clinical signs and symptoms of active TB, they do not pose any threat to others and are not infectious.

Some people develop TB disease soon after infection, before the immune system can control the bacteria. The risk of disease progression is highest within the year after infection occurs. There are some groups of people who have a higher than normal risk of developing active TB. These include persons with human immunodeficiency virus (HIV) infection or other immune suppressing conditions

(transplant recipients); persons with other medical conditions such as diabetes, silicosis, and malnutrition; or those in the extremes of ages (infants and elderly).

General symptoms include a persistent cough, weight loss, fever, night sweats, chills, loss of appetite, and fatigue. The most reliable signs of TB are a cough that persists for more than 2 weeks, often with blood tinged sputum, and chest pain. Anyone *with these symptoms should be isolated immediately and, as soon as it is possible, seen by a physician.*

Treatment

While at sea, isolation and medical referral is advised. Once in port, the patient should be given a chest X-ray and a medical evaluation by a physician. Appropriate anti-TB medicines should be started and the patient isolated until considered noninfectious by the doctor. TB therapy consists of several drugs, which must be taken for an extended period, usually for at least 6 months. Some of the drugs used include isoniazid, pyridoxine and rifampin. Susceptibility to TB drugs should be tested. Patients are usually considered infectious until sputum samples on three consecutive days show no acid-fast bacilli. *Multidrug-resistant tuberculosis, requires prompt expert medical advice*. When active disease is found on board, the local health authority in the nearest port city should investigate the persons who were close contacts of the patient on the ship. However, this public health function is not available worldwide. If the service is unavailable in the nearest port city, U.S. health officials should be contacted. An investigation can begin underway and should be completed immediately upon return to a U.S. port.

TYPHOID FEVER (ENTERIC FEVER)

Incubation Period: Usually 1-3 wks, depending upon size of infectious dose and vaccine status.

Isolation Period: Isolation not required.

Typhoid fever is caused by the bacterium *Salmonella typhi*. The disease occurs worldwide, but is much more common in areas where sanitation is poor. A high fever with a slow pulse rate, lasting more than a week, plus headache and abdominal pain, may be presenting signs. Onset of fever is gradual and may rise in a stepwise fashion over 2 - 3 days, peaking at 103-104^{o}F (38.8 - 40^{o}C). Chills, mental cloudiness, malaise, constipation, abdominal pain, nausea, and loss of appetite may present early on. Diarrhea and vomiting are less common. One-third will have a dry cough.

Within the first week, a sparse rash may appear on the chest and/or abdomen which typically consists of a few red, flat, nontender lesions ("*rose spots*"), 1-2 mm in diameter. The abdomen may be slightly distended with a varying degree of tenderness. Bleeding and perforation of the bowels are two of the most common complications of typhoid fever; typically occurring 2-3 weeks after the onset of the

illness. When typhoid fever is suspected, Immediate evacuation to the closest medical facility is indicated.

Treatment

As soon as typhoid fever is suspected, medical advice should be obtained by radio. If persons with typhoid fever are left untreated, symptoms may persist for weeks to months; and 10-20% may die. When given appropriate antibiotics, recovery within 2 – 3 days is usual with few deaths (< 1%). Chloramphenicol had been used worldwide, but resistance has developed to it. Trimethoprim/sulfamethoxazole and ciprofloxacin are alternatives. Rehydration with oral fluids and/or intravenous therapy may be required. Obtain medical advice. Acetaminophen may be given for pain and fever.

Prevention

Poor sanitation and the prevalence of asymptomatic carriers are major factors of transmission. Personal hygiene and protection of water sources, particularly aboard ship, is of utmost importance. Care should be taken when getting water in foreign ports. Vaccines are available but a large dose of the bacteria can overcome such protection. Patients may continue to excrete typhoid bacteria in stools or urine for weeks to months after recovery and 2 - 5% of patients become long-term carriers. Patients and carriers cannot be allowed to handle or prepare food for others until they are cleared to do so by a physician (requires three negative stool cultures at one-month intervals). Persons caring for typhoid fever patients must wash their hands carefully. Linens should be disinfected routinely. The ship's water system must be disinfected. Public health authorities should be alerted of cases of typhoid fever as they arise.

TYPHUS FEVER

Incubation period: 10 to 20 days.

Isolation period: Until declared free from infection by a physician.

Typhus fever is a term applied to several worldwide forms of disease that are caused by obligate intracellular bacteria of the family Rickettsiaceae. Each form of this disease is characterized by sudden onset of nonspecific symptoms that often include fever, headache, chills, muscle aches, joint pains, and rash. Malaise may progress to prostration. Anorexia, cough, and photophobia (pain from bright lights) may also occur. Each species of rickettsia is transmitted via a particular arthropod vector, including ticks, lice, fleas, and mites. Humans who engage in activities that bring them in close contact with vectors, reservoirs, or both, are at increased risk for these zoonotic diseases.

The most serious of the typhus fevers is Rocky Mountain spotted fever (RMSF). This disease is carried by a tickborne vector and is the most commonly encountered rickettsia in the United States. Persons who have frequent outdoor exposures to

ticks, including campers, hikers, fisherman, and hunters, are at increased risk for infection. Other tickborne typhus fevers are named for the geographic region where they are found.

Louse-borne typhus is transmitted within populations living at high altitudes or cold climates where pediculosis is common and bathing and laundering of clothing are infrequent. The disruption of community services, such as electricity and water supplies, that often accompanies armed conflict and natural disasters, provides a potential setting for epidemics.

Brill-Zinsser disease occurs as a milder recurrence (recrudescence) among persons who have been inadequately treated in the past for their louse-borne typhus (or among those who have recovered from louse-borne typhus whose immune status has diminished).

Fleaborne typhus has a worldwide distribution but is uncommonly reported in the U.S. It is prevalent among populations that live in close association with rodents and their fleas. Persons who have occupational exposure to rodents (e.g., agricultural workers) are at risk.

Miteborne typhus (scrub typhus) is widespread throughout Asia and the Pacific Islands. Edge or scrub vegetation provides habitat for rodent hosts of vector mites, and human populations that frequent these areas, including military personnel and agricultural workers, have increased risk.

With all the typhus fevers, infection occurs when rickettsiae are introduced through the skin by the bite of a tick or a mite, or by the rubbing of infectious feces from lice or fleas into the skin. A necrotic lesion (a skin lesion with dead or dying tissue) occasionally occurs at the site of inoculation in some patients with tick typhus or rickettsialpox. Such a lesion is common in patients with miteborne typhus.

Multi-organ failure may result. This may be manifested most commonly by confusion or stupor, severe difficulty breathing, kidney and liver failure, as well as shock. Heart problems may occur. Clotting problems may cause gangrene. Typhus fever can be a fatal disease.

Treatment

If the medical attendant suspects that a patient has typhus, immediate medical advice by radio should be obtained on diagnosis and treatment.

The patient with one of the typhus fevers must be isolated in a vermin-free room. The patient cannot directly transmit the disease to others. However, if the patient harbors infected lice or other insect vermin disease can be transmitted. Begin measures to kill any lice present.

Prompt antibiotic therapy is necessary to prevent serious complications. Patients with fulminant, life-threatening typhus fevers, including RMSF and louse-borne typhus, may die before serologic confirmation can be made. Hence, treatment

should be initiated on clinical grounds, on the basis of symptoms and signs, and a history that suggests possible exposure to habitats where the vectors reside.

Tetracycline, doxycycline, and chloramphenicol are the drugs most suitable for treatment of the typhus fevers and antibiotics are highly effective when administered in appropriate dosage early in the course of illness. Patients often show improvement within 24 hours of initiating antibiotics, and they frequently recover markedly within 72 hours. However a full course of antibiotics is indicated.The patient should also receive symptomatic treatment as needed. Sedatives may be required but should be given based on medical advice rendered. For pain, oral codeine sulfate may be given.

Typhus is an official notifiable disease. Federal and international regulations require that the Master, as soon as practical, notify the local health authority at the next port of call, station, or stop. To prevent the spread of the disease the Master should take such measures as the local health authority directs.

UNDULENT FEVER (BRUCELLOSIS, MALTA FEVER OR MEDITERRANEAN FEVER)

Incubation period: Less than 5 days to several months, most cases occur 2 - 8 wks after exposure.

Isolation period: Unless the patient has a draining wound, no special precautions are required.

Brucellosis is acquired by direct contact with secretions and excretions of infected animals and by ingestion of the milk of cows, sheep, or goats or the products of their milk (butter and cheese) containing the Brucella organisms. The disease is only rarely transmitted from person to person. Brucellosis is more common in rural areas and is commonly an occupational disease of meat packers, veterinarians, farmers, and livestock producers. Distribution of brucellosis is worldwide, though the disease is more common in the Middle East, Southwest Asia, Africa, and parts of Latin America.

The disease is characterized by an acute febrile stage and by a chronic stage with relapses of fever, weakness, sweats, and general aches and pains. The diagnosis is difficult since the presentation is often vague and nonspecific. Intermittent fevers, often associated with drenching perspiration, are common. Duration of disease ranges from several days to months, or even years.

A definitive diagnosis is based on isolation of the organism, usually from the blood or less often from other affected tissues. Serologic testing for brucella antibody may be helpful. The patient should be referred for proper medical evaluation once in port. Even with serologic testing diagnosis may have to be based on history of exposure, epidemiologic data, and characteristic clinical findings.

Treatment

If brucellosis is suspected an extended couse of doxycycline is recommended. Tetracycline should be avoided in children under 7 years of age and cotrimoxasole should be considered for this group. Severe musculoskeletal pains, especially over the spine, may require codeine. Activity should be restricted in acute cases, with bed rest recommended during febrile periods.

Prevention

Prevention of brucellosis is based on reducing exposure to the organism. Restricting exposure to infected animals and prevention of exposure to *Brucella sp.* containing foodstuffs by drinking only pasteurized milk and dairy products is recommended. Persons handling animals or carcasses of potentially infected animals should wear goggles (or glasses) and rubber gloves and should protect skin breaks from bacterial invasion.

WHOOPING COUGH (PERTUSSIS)

Incubation Period: 7 to 14 days.

Isolation Period: For 4 weeks (after the cough begins.)

Whooping cough is a highly communicable bacterial disease that is caused by the bacillus *Bordetella pertussis*. Historically, lack of compliance with recommended vaccination protocols has been associated with outbreaks of pertussis in the U.S. The disease should be suspected if the patient had been exposed to a case of whooping cough one to three weeks previously, develops a cold followed by cough. The coughing spasms often result in vomiting and are associated with the typical "whoop." The disease is spread by the patient's respiratory secretions through coughing, sneezing, and close contact.

The characteristic whooping type of cough reaches its worst stage about two or three weeks after symptoms begin. The convalescent stage occurs when coughing reduces in frequency and severity, and vomiting decreases.

Rarely, a few patients develop serious complications such as pneumonia, middle ear infection, chronic bronchitis, or encephalitis.

Treatment

Medical advice by radio should be obtained, particularly for recommendations regarding prophylaxis of shipmates and other close contacts.

The patient should be isolated for at least five days after initiation of erythromycin, or until 4 weeks after the onset of cough. The spread of whooping cough can be limited by treating the patient with antibiotics and by protecting close contacts. To reduce infectivity as quickly as possible, a course of oral erythromycin or sometimes clarithromycin or azithromycin, is recommended for patients with clinical pertussis. Antibiotics should be given for 14 days.

Symptomatic therapy with codeine sulfate should be given if needed. It is important to maintain the patient's intake of fluids and soft foods.

Erythromycin, clarithromycin, or azithromycin prophylaxis should be administered for 14 days to all household and other close contacts (shipmates) of persons with whooping cough, regardless of age and vaccination status. This may prevent or minimize transmission of the disease to others.

YAWS

Incubation Period: 9 to 90 days; generally 21 to 42 days.

Isolation Period: None. Avoid intimate contact and contamination of the environment prior to treatment and until 48 to 72 hrs after penicillin treatment.

Yaws is a highly infectious, nonvenereal, bacterial tropical disease caused by *Treponema pallidum*, subspecies *pertenue*, a species of spirochete similar to that of syphilis. Yaws is limited to tropical and remote regions of Africa, South America, the Caribbean, Southeast Asia and Indonesia. In urban areas of these tropical regions, the lesions of yaws are difficult to distinguish from those of syphilis. Although the disease strikes all age groups, it is mainly a disease of children. The organism that causes yaws can enter the body through a slight scratch or other break in the skin. The disease may be spread through physical contact with sores of infected patients or their clothes; or by insects contaminated by discharges from the patient's skin.

About a month after a person becomes infected, the first symptom appears as a painless inflamed raspberry-red elevation of the skin. This is called the "mother yaw" that enlarges and forms an ulcer in its center. The primary lesion may heal in a few weeks or persist for months if left untreated.

Two to eight weeks after the appearance of the "mother yaw," open oozing sores occur on the face, scalp, trunk, hands, or feet. The patient may show a slight rise in temperature, general malaise, headache, and pains in bones and joints. There may be a fine peeling of the skin. Wart-like lesions may run together in masses that project about a half inch above the surface of the skin. In two or three weeks as the discharges lessen, the lesions get smaller and finally heal. Ulcers on the soles of the feet may be very painful and resist healing. Skin lesions may disappear in untreated cases. After several years lesions may recur. They can cause cause disfigurement of the nose and facial tissue and deformities of the hands and feet.

Treatment

Medical advice on treating yaws should be obtained by radio. The patient should be isolated and the lesions covered with a simple dry dressing. Soiled dressings should be discarded carefully. The infection rarely is fatal and antibiotic treatment should be withheld if the patient will reach port soon. This will not jeopardize the general health of the patient. If treatment aboard ship is necessary, an intramuscular injection penicillin G procaine should be administered, unless it is contraindicated by allergy.

YELLOW FEVER

Incubation Period: 2 to 6 days.

Isolation Period: About 6 days. Screen the patient's room, use a bednet, and spray quarters with insecticide that has a residual effect.

Yellow fever is a generalized often fatal viral disease that is transmitted by the bite of an infective female *Aedes aegypti* mosquito, the same mosquito vector that transmits Dengue fever. In tropical forests several other species of mosquitoes also transmit it. Yellow fever occurs only in Africa and South America.

To spread the disease a female mosquito must feed on the blood of an infected person about two days prior to onset through the third or fourth day of the attack. The virus develops in the mosquito for 9 to 12 days during which time she cannot transmit the disease. Thereafter for the rest of the female mosquito's life, she can give yellow fever to any nonimmunized person that she bites.

The disease has a swift severe onset with chills and high fever, intense headache, plus pains in the limbs and back. There is nausea, vomiting, and prostration. The face appears flushed. The eyes are watery with the lining of the eyelids an inflamed red. The fever usually reaches a maximum 104^0F (40^0C) within 24 hours. Muscle pains worsen and the patient is restless, anxious, and sleepless. The tongue is bright red along the edges with a furred coating in the middle. As the disease progresses and the temperature increases, the pulse rate may show a drop from a rate of 120 per minute to 50-60 per minute. In three to five days the fever may go down and there will be a lull of a few hours to a day or two. The patient feels better and may begin to recover. In severe cases, however, the lull is followed by a return of the vomiting and fever. Three characteristic clinical symptoms appear

- marked jaundice (yellow color) of the eyes and skin about the third day because the virus destroys liver cells
- albumin in the urine because the kidneys are affected
- "coffee grounds vomitus" from blood that has seeped through mucous membranes into the stomach and is partially digested.

Other signs of hemorrhage are tarry stools; nosebleed; blood from tongue, lips, and gums; and purple spots in the skin. The urine flow lessens and may contain blood. Interference with kidney and liver function can lead to delirium, convulsions, coma, and death in some cases. Alternatively, these symptoms may subside and the patient may recover.

An attack of yellow fever may be very mild, with only slight backache, headache, and a fever that lasts about two days. It may be severe as just described, or there may be a sudden violent attack with rapid development of the worst symptoms. The death rate ranges from 10% to 85%. One attack provides immunity thereafter. If a patient is suspected of having yellow fever, ask about vaccine history. If a person

has had a yellow fever vaccination within the last 10 years, other diagnoses should be considered.

Treatment

There is no specific treatment for yellow fever. Complete bedrest in isolation in a mosquito-proof area with the best of nursing care are necessary. Forced fluids are needed to prevent dehydration; intravenous fluids may be indicated. For fever, an ice cap or cold compresses should be applied. It is best to avoid sedatives. For severe pain and fever, in a patient without evidence of liver disease, acetaminophen or ibuprofen should be given by mouth every four to six hours as needed. Aspirin may worsen bleeding. To relieve mouth dryness, cracked ice may be given. When tolerated, a diet high in carbohydrates (breads, potatoes, cereals) and low in protein and fats should be given.

Prevention

In combating yellow fever the emphasis must be on prevention rather than cure. Crews of ships bound for yellow fever areas should be immunized. One inoculation will produce immunity that will last for ten years. All countries in yellow fever areas require that persons entering ports of that country be immunized before entry. Crew members should keep proof of vaccination in their yellow International Certificates of Vaccination. Some countries require proof of vaccination for persons arriving from a yellow fever endemic area. All measures described under malaria for the control of mosquito-borne diseases should be carried out when the ship is in a port where yellow fever prevails.

Federal regulations require that the Master, as soon as practical, shall notify local health authorities at the next port of call, station, or stop that he has a suspected case of yellow fever aboard. The Master shall take such measures to prevent the spread of the disease as the local health authorities direct.

In the days of the great sailing ships, yellow fever was transmitted on board mosquito infested ships. If a case occurs aboard ship, the patient must be isolated and mosquito netting must be placed over the patient's bunk for at least six days after onset. Nonimmune crew who report mosquito bites should be isolated to the extent possible and inspected daily for symptoms. Yellow fever cannot be transmitted by direct contact with a patient’s blood, vomitus, or body fluids. However, other potentially serious viral infections resembling yellow fever can be transmitted by such contact. Persons caring for the patient should wear gloves and avoid exposure to patient blood and fluids. The ship must be freed from mosquitoes by the use of residual insecticide sprays or other means of control. *Yellow fever is potentially fatal. Immediate medical advice by radio should be obtained.*